

## SR1000 Requirements

## 1 INTRODUCTION

## 1.1 Purpose and Scope

The Federal Aviation Administration (FAA) Act of 1958 charges the FAA with providing safe and efficient air traffic control service to the public. This document is the compilation of high-level requirements that describe the operational capability requirements to achieve the provisions of the act for the National Airspace System (NAS) as the NAS exists today and is envisioned to exist by the year 2017. In that context, it includes those existing and transitional system capabilities needed for the 2017 system. This document is intended primarily for use as an internal FAA management tool to support the NAS enterprise architecture engineering, and acquisition activities and to manage and control change to the NAS. This document relates requirements for the Air Traffic Service Group and reflects the services that are provided by the NAS and are captured in the NAS Service Based Enterprise Architecture. These services, referred to as the NAS Service Architecture, include lower level "capabilities" that each service will deliver as discussed in the Overview section. The requirements are allocated to the appropriate service and capability. This relationship allows an association with defined functionalities and promotes the identification and assignment of performance and reliability, maintainability and availability attributes. This set of high-level requirements establishes both the baseline of the current NAS and also identifies future needs for the NAS.

## 1.2 Background

The FAA has established specific goals for modernization of the National Airspace System over the next decade as outlined in the FAA Flight Plan. Two of the goals described in the Flight Plan are reflected in this document to 1. "Work with local governments and airspace users to provide capacity in the United States airspace system that meets projected demand in an environmentally sound manner" and 2. "To achieve the lowest possible accident rate and constantly improve safety". The requirements identified in this document provide the baseline of today's operating NAS and the future NAS in support of these goals. In conjunction with the FAA Flight Plan, the FAA has prepared operational and system engineering management documents to assist in the orderly development and integration of systems in support of the NAS and to identify high level NAS requirements which are then defined in lower level specification and design documents. The NAS Architecture represents the proposed implementation of the requirements which are consistent with policy and operations guidance documents to include the: The Architecture also provides the framework for the work being performed by the Joint Planning and Development Office (JPDO), which is currently developing a national plan through the year 2025. The resulting requirements are presented in this document as a management tool to facilitate modernization and implementation of the NAS Architecture and to provide a forum for extensive coordination and validation of associated requirements.

## 1.2.1 Document Structure

Section 2 of this document gives an overview of the nine services and their corresponding capabilities. These services and capabilities form the high level structure for the organization of the requirements. Requirements for the Services and Capabilities are in Section 3. Section 3 also contains Enabling Service Requirements that supplement the services the NAS provides. Section 4 contains a Glossary of the terms that are used in the document. Section 5 lists all of the acronyms that are used in the document. Section 6 list the action verbs used in the requirements.

## 1.3 Mission

The mission of the FAA includes the central objective of providing for the safe and efficient use of the nation's airspace, while minimizing constraints on its use. The NAS requires direct services to meet the needs of all users, in order to support aircraft operations under varying conditions of weather, demand on the system, and emergency situations. Flight planning, aircraft separation, air defense, law enforcement, control, and monitoring capabilities are required along with surveillance, navigation, and communication capabilities supporting the oceanic, remote, en route, terminal, and aerodrome operations. Additionally, maintenance support and system effectiveness requirements are imposed.

## 2 OVERVIEW

## 2.1 Service Groups

Service Groups are comprised of related Services. Services are high-level activities, performed by the FAA for the aviation community, that contribute to the flow of aircraft through the NAS.

## 2.2 Service Group - Air Traffic

Air Traffic Services is a function of the FAA that is dependent upon capabilities found in the Architecture.

## 2.2.1 Service - Flight Planning

The Flight Planning Service provides both flight plan support and flight plan data processing to support the safe and efficient use of the nation's airspace through the development and use of coordinated flight plans. This includes preparing and conducting pre-flight and in-flight briefings, filing flight plans and amendments, managing flight plan acceptance and evaluation, preparing flight planning broadcast

messages, and maintaining flight-planning data archives. This service offers preparation to conduct a flight within the NAS and allows changes to flight profiles while operating within the NAS.

#### 2.2.1.1 Capability- Flight Plan Support

Flight plan support provides NAS users essential weather and aeronautical information. Flight planning requires such information as expected route, altitude, time of flight, available navigation systems, available routes, special use airspace (SUA) restrictions, daily demand conditions, and anticipated flight conditions, including weather and sky conditions (e.g., volcanic ash, smoke, or birds). There is an exchange of a variety of data to support flight planning including NAS operational and maintenance status, weather, and FAA facility status, with numerous NAS users. These include, fixed base operators, pilots and flight planners, airline operations centers personnel, and Department of Defense (DoD) operations offices personnel. Planning and preflight briefings contain current and forecast weather, including winds and temperatures, surface conditions, and any significant meteorological condition. Aeronautical information includes notices to airmen containing information concerning establishment of, condition of, or change in any NAS component (facility, service, or procedure, or hazard in the NAS). The timely knowledge of this information is essential to flight.

#### 2.2.1.2 Capability- Flight Data Management

Flight Data Management maintains the knowledge of a flight within the NAS from activation until flight plan cancellation or closing. Flight Data Management accepts, processes, and validates flight plan data from all users (e.g., general aviation, commercial, military, Customs, law enforcement, etc.). Flight Data Management provides processing and evaluation of preflight and in-flight flight plan amendments, cancellations, and flight plan closures for Visual Flight Rules (VFR) and Instrument Flight Rules (IFR) flights. Flight plans for domestic and international flights are evaluated, and users are notified of any problems. Implementation of flight data management occurs at or near the start of a planned flight. It includes flight plan activation following issuance of a clearance for flight; distributing flight plans to appropriate ATC facilities along the route of flight, updates based on current position, and updates along the route of flight based on in-flight amendments. The NAS disseminates flight plan information to all users as necessary. Information associated with the flight before, during, and after the flight remains available.

#### 2.2.2 Service - ATC-Separation Assurance

The separation assurance service ensures that aircraft maintain a safe distance from other aircraft, vehicles, terrain, obstacles, and certain airspace not designated for routine air travel. Separation assurance involves the application of separation standards to ensure safety. Standards are defined for aircraft based on aircraft type, size, equipment, and for operating in different environments.

##### 2.2.2.1 Capability- Aircraft to Aircraft Separation

Aircraft are separated from other known aircraft in the terminal, en route, and oceanic environments. Separation assurance involves the application of separation standards to ensure aircraft remain an appropriate minimum distance or altitude from other known aircraft. Standards are defined for aircraft based on aircraft type, size, equipment, and for operating in different environments.

##### 2.2.2.2 Capability- Aircraft -Terrain-Obstacle Separation

Aircraft are separated from terrain and obstacles using published safety zones and processing position and intent information. Aircraft positions are derived from navigational systems, surveillance information, visual orientation, and position reports to ensure an aircraft's trajectory maintains a minimum safe distance from terrain and obstacles. Aircraft to terrain/obstacle separation capability provides ground and obstacle avoidance instructions to aircraft to ensure aircraft maintain a safe distance from the ground, mountainous terrain, and man-made obstacles.

##### 2.2.2.3 Capability- Aircraft-Airspace Separation

Aircraft are separated from airspace for special use such as prohibited, restricted, and warning areas. The SUA is designed to ensure safety for unique aircraft operations or to prohibit flight within a specified area. Separation standards ensure aircraft remain an appropriate minimum distance from the airspace. The standards are applied via methods including regulatory publications and specific control instructions.

##### 2.2.2.4 Capability- Surface Separation

Aircraft are separated from vehicle movements on the airport movement area, taxiing aircraft, water vehicles, and from designated critical zones, etc. Standards are employed to ensure safe operation on the surface. Surface separation of aircraft while they are operating on the airport surface is a shared responsibility.

#### 2.2.3 Service - ATC-Advisories

Air traffic control and other facilities provide advice and information to assist pilots in the safe conduct of flight and aircraft movement. These advisories include providing weather information, traffic, and NAS status information to pilots, flight planners, and the general public. These advisories and information are either directed to a specific location or broadcast to any user in the area.

##### 2.2.3.1 Capability- Weather Advisories

ATC Advisories - Weather information is available either automatically or manually through communication with ATC and other facilities. For

example, pilots receive weather advisories from automated surface observing systems and other systems, ATC facilities, and aircraft operations centers (AOCs). Advisories provide both routine and hazardous weather information and/or flight conditions at airports or along a flight path.

#### 2.2.3.2 Capability- Traffic Advisories

Traffic advisories are provided to alert aircraft to potential conflicts with others on the surface or in-flight. For example, traffic advisories are provided to aircraft or other flight objects that are in the proximity of hot air/gas balloons, missile launches, or other potential hazards. Traffic advisories for aircraft on the surface include the number, type, position, and intent of the ground traffic.

#### 2.2.3.3 Capability- NAS Status Advisories

Information about NAS status that has changed or was not readily available during flight planning is provided to in-flight aircraft. This includes updates concerning the operational status of airspace, airports, NAVAIDS, in-flight or ground hazards, traffic management directives, and other information that is essential to the safety and efficiency of aircraft.

#### 2.2.4 Service - TM-Synchronization

Traffic synchronization supports expeditious flight for the large number of aircraft using the NAS during any given period of time. NAS processes operate to maximize efficiency and capacity in response to weather, NAS infrastructure, runway availability or other conditions. Traffic synchronization is the tactical portion of traffic management providing sequencing, spacing, and routing of aircraft. Traffic synchronization activities are accomplished while maintaining separation assurance and implementing strategic flow management directives. The traffic synchronization service provides tactical instructions to optimize operations while airborne and on the surface.

##### 2.2.4.1 Capability- Airborne Synchronization

Airborne synchronization or spacing and sequencing of air traffic safely maximize the efficiency and capacity of the NAS throughout the cruise, arrival, and departure phases of flight. Maximum efficiency, predictability and capacity are obtained through the application of processes, which reduce variability in achieving the defined separation standards. Traffic synchronization is provided to aircraft during cruise, through metering at fixes/waypoints, and modifying traffic flow patterns to meet operational objectives and accommodate user preferences.

##### 2.2.4.2 Capability- Surface Synchronization

The surface is managed by formulating taxi sequences and communicating instructions to pilots and vehicle operators for the safe and efficient flow of traffic on the airport surface. Surface synchronization involves processes intended to maximize surface efficiency, predictability, and capacity. It includes such activities as assigning runways, taxi sequences and providing movement instructions.

#### 2.2.5 Service - TM-Strategic Flow

The strategic flow service provides for orderly flow of air traffic from a system perspective. NAS demand and capacity is analyzed and balanced to minimize delays, avoid congestion, and maximize overall NAS throughput, flexibility, and predictability. Actual and predicted demand is compared to the current and predicted capacity of the NAS airspace, airports and infrastructure to plan the overall NAS strategy. When necessary, traffic flow management (TFM) plans are developed collaboratively to optimize the flow of traffic while accommodating user requests and schedules, airspace, infrastructure, weather constraints, and other variables. The strategic flow service is comprised of long-term planning (more than one day in advance), flight-day traffic management (current 24-hour period) and performance assessment capabilities.

##### 2.2.5.1 Capability- Long Term Planning

Long term planning works to maximize efficiency by developing predictions of capacity and demand more than one day in advance. Inputs include capacity and demand models based on airport use data, airspace for special use schedules, airline flight schedules, infrastructure status, and historical flight traffic demand information. It also includes activities designed for continual improvement in the predictive capabilities such as model validation, assessment of specific planned and executed strategies trend analysis and recommended changes.

##### 2.2.5.2 Capability- Flight Day Management

Flight day traffic management optimizes NAS traffic flow for the current 24-hour period. Demand profiles are compared with projections of NAS capacity for the current day and identify periods and locations where predicted demand exceeds predicted capacity. Specific responses to maximize efficiency are developed and implemented through collaboration across the NAS.

##### 2.2.5.3 Capability- Performance Assessment

Performance assessment provides institutional memory by archiving information to support post-flight analyses of NAS traffic flow. The effectiveness of NAS performance is analyzed to propose future improvements. Air traffic trends and activities are analyzed, problems identified and alternatives for improvement developed and evaluated. Long-term improvements to NAS performance include recommended changes to schedules, airspace design, ATC procedures, and the NAS infrastructure.

#### 2.2.6 Service - Emergency and Alerting

The emergency and alerting service monitors the NAS for distress or urgent situations, evaluates the nature of the distress, and provides an appropriate response to the emergency. Applicable situations include those that occur on the ground or in-flight. Emergency services include emergency assistance and alerting support.

#### 2.2.6.1 Capability- Emergency Assistance

Emergency assistance provides direct support in the protection of individuals and property both in the air and on the ground. ATC services range from assisting an aircraft low on fuel to the nearest airport, aircraft involved in a hijacking, to alerting rescue coordination agencies that an aircraft is overdue or missing. NAS ATC facilities provide: urgent/distress declarations, aircraft, weather and traffic flow information, and flight plan information to support emergency situations.

#### 2.2.6.2 Capability- Alerting Support

Alerting support provides indirect assistance for those events/circumstances in which the response is external to the system. For example, when information is received that an aircraft is overdue or missing, ELT signals are received, or search and rescue services may be required, alerting support provides the relevant information and coordinates with the appropriate international, military, federal, state, and local agencies. The appropriate organization(s) then provide direct response(s).

#### 2.2.7 Service - Navigation

The Navigation service provides electronic signals-in-space to enable suitably equipped NAS users to determine aircraft position and to operate safely and efficiently under most weather conditions. Avionics onboard the aircraft receive and process the signals to provide current position, distance from a predefined or selected position, course selection, and course deviation. The Navigation service includes both ground- and space-based networks of electronic navigation aids (NAVAIDS), as well as visual NAVAIDS, in accordance with international standards. The network of NAVAIDS enables users to navigate during airborne operations (such as cruise, approach, and landing) and during surface operations.

##### 2.2.7.1 Capability- Airborne Guidance

NAS provides signals in space through space-based mechanisms and ground based aids for point-in-space navigation through a variety of operating environments. These environments include structured routes, random routings and transitions. Guidance is provided for position determination in both vertical and lateral planes in all phases of flight. Additionally, visual aids provide guidance to aircraft transitioning to and from the surface. Visual NAVAIDS provide approach and landing guidance to aircraft in addition to electronic type NAVAIDS. Visual references are particularly important during the transition from instrument to visual flying just prior to landing.

##### 2.2.7.2 Capability- Surface Guidance

NAS provides mechanisms and aids for maneuvering on the airport surface safely and efficiently. Airport surface guidance is provided by electronic and visual means to aircraft maneuvering on the airport surface. Surface guidance includes taxiway lighting and markings, runway markings, and identification of any obstacles in the vicinity.

#### 2.2.8 Service - Airspace Management

The airspace management service ensures the safe and efficient organization and use of the national airspace resource. Airspace management includes two aspects: design, and organization and implementation. Airspace design establishes the guidelines for airspace structures in order to accommodate the different types of air activity, volume of traffic, and differing levels of service. Airspace organization and implementation is the process by which the airspace design options are selected and applied to meet the needs of the ATM community.

##### 2.2.8.1 Capability- Airspace Design

Airspace design criteria establish the conditions for designing structures in the airspace to support safety of flight and efficient flow of traffic. Design criteria include the standards and guidelines for establishing classes of airspace, designation of volumes of airspace for the provision of separation (sectors, special use, etc.), waypoints, published routes etc. The criteria include identification of those structures, which require rulemaking, publication, environmental evaluations, procedure development actions, etc. The guidelines also include criteria to support the design process - objectives in the design to meet demand, performance criteria for evaluating the efficiency of the design, infrastructure coverage criteria and constraints, etc.

##### 2.2.8.2 Capability- Airspace Management

Airspace for special use provides support to the national defense mission, fosters the development of commercial space enterprises, protects sensitive areas, and ensures the protection of other natural resources. Designation and management of airspace for special use ensures optimal access, flexibility and predictability for airspace users.

#### 2.2.9 Service - Infrastructure/Information Management

Infrastructure management ensures a safe and efficient NAS through management and operation of the infrastructure and optimal use of resources. Infrastructure resources include systems such as radar, communication links, navigation aids and automation, while

infrastructure management includes monitoring and maintenance of the NAS.

#### 2.2.9.1 Capability- Monitoring and Maintenance

Monitoring and maintenance includes the activities necessary to monitor the NAS status, detect and isolate failures and outages, and perform corrective and preventive maintenance to ensure the operational readiness of the NAS. Maintaining, operating, and managing the infrastructure requires a variety of planning, engineering, analysis, repair, and maintenance functions. It also includes monitoring status, real time assessments and systems implementations in the NAS.

#### 2.2.9.2 Capability- Spectrum Management

Spectrum management secures, protects, and manages the radio spectrum for the FAA and the U.S. Aviation community. It is the focal point for management policy and plans, engineering, frequency assignment, radio interference resolution, radiation hazard, obstruction evaluation, electronic counter measures, and other National/International spectrum activities.

#### 2.2.9.3 Capability- Government-Agency Support

Government/agency support provides information and coordination services. Examples of the agencies and organizations supported include military air defense operations, law enforcement, government land management, drug interdiction, state aviation, Customs, the National Transportation Safety Board, and Homeland Security among others.

#### 2.2.10 Enabling Services Requirements

The FAA is responsible for providing air traffic control services within the United States and Oceanic areas as delegated. Those Services include: Flight Planning, Separation Assurance, ATC Advisory Services, Traffic Synchronization, Traffic Flow, Emergency Services, Navigation, Airspace Management, and Monitoring and Maintenance. To provide these services at the highest level, overarching technology and operational information is enabled by automation, communications and security protection.

##### 2.2.10.1 Automation

Automation enables information presentation, configuration and availability. This technology allows information to be requested, stored, archived and retrieved. Automation will present/retrieve information in various formats, display these formats in a range of presentation options (written, graphically, numerically, etc.) to enhance safety and capacity of the NAS. Automation is a key enabler of flight plan support and management, retrieval and display of separation assurance information, collation of weather, and ATC advisories across the NAS. Automation supports both Traffic Synchronization and Strategic Flow by providing a collaborative system view of current and projected traffic flow to traffic management specialist and users defining traffic scenarios.

##### 2.2.10.2 Communication

Communications enables the NAS to exchange information with users, specialists, ATC facilities, and other Government agencies. Communications enables air traffic control operations within the NAS by employing appropriate technologies to exchange voice and data. This information is transported over land lines and wireless connectivity utilizing government and commercial assets. Communications defines how data is moved across the NAS to accomplish flight planning, control functions and navigation services for ground and space based systems. This enabler provides end-to-end service to pilots to include disseminating and coordinating the flight plan and defines how controllers provide service throughout the flight while coordinating with other facilities and government agencies. The communications enabler supports collaboration between users and specialists for traffic synchronization and flow services. Communications support the exchange of navigation and surveillance information across the NAS. Information includes electronic signals emanating from ILS, VOR and space based systems and aircraft transmitted beacon code data.

##### 2.2.10.3 Security

Security is integral to the NAS and is addressed within each service and the automation and communication enablers. Security is essential to assure the availability, integrity, and confidentiality of operations. Security for the NAS is a balance of functional performance and appropriate protection of NAS components from external and internal threats. NAS security protection includes: Physical (facilities, systems); Personnel (personal access identification); and Information (software, hardware, communications, etc.). Security protection includes processing, storage, and communication (data or voice) of air traffic control information, mission support information and controls, and administrative information. Security assures integrity and availability, access control, identification and authentication, confidentiality, malicious code repudiation, and recovery.

#### 2.2.11 Performance Requirements

Performance requirements define the maximum satisfactory response time to be experienced for each exchange of data. Performance requirements may also define the response time that is minimally acceptable, the typical throughput required, and the size and timing of maximum-throughput periods. These requirements will be added to the official SR-1000 document at a later date.

#### 2.2.12 Reliability, Maintainability, and Availability

RMA requirements define what percentage of time services will be available to the user. These requirements will be added to the official SR-1000 document at a later date.



## 2.3 Other Service Groups

The Regulation, Licensing, and Certification Services Group provides standardized operating policies and requirements for National Airspace System (NAS) users within the aerospace community. The NAS is required to aid in the management of airport systems. This includes reviewing their compliance with federal regulations, engineering standards, financial assistance, and environmental impact assessments. The NAS is also responsible for aiding in planning, infrastructure and information development, and aircraft operations and support. The NAS also provides Safety Services to provide a safe and efficient operating environment that maintains the aviation and aerospace communities and the public's high confidence when flying. Security services protect users against terrorist and criminal acts to protect the NAS facilities, equipment, and employees. These services include providing physical security for air traffic and airport facilities, security for passengers, and information security of communications and other NAS functional areas.

## 3 ATS SERVICE REQUIREMENTS

### 3.1 Flight Planning Services

#### 3.1.1 Flight Plan Support

Safe and efficient use of the nation's airspace requires the provision of flight planning capabilities. Flight planning requires information such as expected route, altitude, and time of flight, as well as the anticipated flight conditions including weather, navigation systems, available routes, special use airspace, and flow control conditions.

##### 3.1.1.1 Accept proposed flight plans

The NAS shall accept VFR flight plans.

The NAS shall accept IFR flight plans.

The NAS shall accept flight plans up to 24 hours in advance of proposed departure time.

The NAS shall accept proposed flight plans from external interfaces.

The NAS shall accept flight plans from specialist.

The NAS shall accept proposed flight plans from specialists.

The NAS shall accept amendments to proposed flight plans from users.

The NAS shall accept amendments to proposed flight plans from specialists.

The NAS shall acquire flight plan reservations from military users.

The NAS shall acquire requests for special movement activities by military aircraft.

The NAS shall accept flight plans in NAS format.

The NAS shall accept flight plans in ICAO format.

##### 3.1.1.1.1 Accept altitude reservation requests

The NAS shall accept altitude reservation requests.

The NAS shall acquire altitude reservations.

The NAS shall store altitude reservations.

The NAS shall display altitude reservations.

The NAS shall approve altitude reservations.

The NAS shall disseminate altitude reservations.

The NAS shall accept entry of trial altitude reservations.

The NAS shall coordinate requested altitude reservations with traffic management coordinators affected by the reservation request.

#### 3.1.1.1.2 Acquire requests for airspace reservation

The NAS shall acquire requests for airspace reservations based on emergency order of precedence.

The NAS shall respond to requests for airspace reservations based on emergency order of precedence.

#### 3.1.1.1.3 Accept route proposals

The NAS shall accept route proposals.

The NAS shall accept route proposals for military aircraft conducting special interest flights.

The NAS shall reject route proposals based on military requirements.

##### 3.1.1.1.3.1 Process Route

The NAS shall process route proposals based on military special requirements.

The NAS shall validate route proposals based on military requirements.

The NAS shall accept route proposals based on military requirements.

The NAS shall store route proposals based on military requirements.

The NAS shall store 1000 or more low-level routes for military users.

##### 3.1.1.1.3.2 Accept proposals for presidential flights

The NAS shall accept route proposals for presidential flights.

The NAS shall approve route proposals for presidential flights.

##### 3.1.1.1.3.3 Accept route proposals for military aircraft

The NAS shall accept route proposals for military aircraft conducting special refueling operations.

The NAS shall approve route proposals for military aircraft conducting special refueling operations.

The NAS shall accept route proposals for military aircraft carrying hazardous cargo.

The NAS shall approve route proposals for military aircraft carrying hazardous cargo.

##### 3.1.1.1.4 Accept Proposed Flight Plans

The NAS shall accept proposed flight plans from users.

The NAS shall accept flight plans containing user-preferred routes.

The NAS shall accept flight plans defining user preferred speed profiles.

The NAS shall accept flight plans defining user preferred altitude profiles.

The NAS shall accept flight plans from users.

The NAS shall accept recurring flight plans from users.

The NAS shall accept flight plan information from users via external data interfaces.

The NAS shall accept multiple flight plans from users.

The NAS shall accept flight plans with multiple flight segments from users.

The NAS shall accept user corrections of errors in a proposed flight plan.

##### 3.1.1.1.4.1 Accept proposed flight plans from users via external interfaces

The NAS shall accept proposed flight plans from users via external interfaces.

The NAS shall accept flight plan information from users via air-ground voice communications.

The NAS shall accept flight plan information via users air-ground data communications.

The NAS shall accept inputs via user supplied, external data interfaces.

#### 3.1.1.1.5 Accept amendments to proposed flight plans from external interfaces

The NAS shall accept amendments to proposed flight plans from external interfaces.

The NAS shall accept proposed flight plan amendments from users via external interfaces.

#### 3.1.1.1.6 Accept specialist correction to errors

The NAS shall accept specialist correction to errors.

The NAS shall accept user corrections of identified error(s) without having to re-input the entire flight plan.

The NAS shall accept specialist corrections without having to re-input the entire flight plan.

#### 3.1.1.1.7 Acquire classified flight plans from military scheduling activities

The NAS shall acquire classified flight plans from military scheduling activities.

The NAS shall accept classified flight plans with security clearances up to and including SECRET from military scheduling activities.

The NAS shall acquire classified flight plans with security classifications up to SECRET from military scheduling activities.

The NAS shall accept classified route proposals with security clearances up to and including SECRET from military scheduling activities.

The NAS shall acquire classified route proposals with security classifications up to SECRET from military scheduling activities.

The NAS shall accept classified flight plans with security classifications up to and including secret.

The NAS shall accept route proposals with security classifications up to and including secret.

#### 3.1.1.1.8 Approve military user requests

The NAS shall approve military user requests for special movement activities within 24 hours.

#### 3.1.1.1.9 Acquire unclassified flight plans from military scheduling activities

The NAS shall acquire unclassified flight plans from military scheduling activities.

The NAS shall accept unclassified flight plans from military scheduling activities.

The NAS shall acquire unclassified flight plans from military scheduling activities.

The NAS shall accept unclassified route proposals from military scheduling activities.

The NAS shall acquire unclassified route proposals from military scheduling activities.

The NAS shall acquire 1000 or more low-level routes for military users.

#### 3.1.1.2 Evaluate Proposed Flight Plans

The NAS shall evaluate proposed flight plans.

The NAS shall notify users when a flight plan has been accepted.

The NAS shall notify users when an amendment has been accepted



The NAS shall notify specialists when a flight plan has been accepted.

The NAS shall notify specialists when an amendment has been accepted

The NAS shall process user proposed flight plans.

The NAS shall process user amendments to proposed flight plans.

The NAS shall process specialist proposed flight plans.

The NAS shall process specialist amendments to proposed flight plans.

The NAS shall validate flight plans from users.

The NAS shall validate flight plans from specialists.

The NAS shall validate user proposed flight plans.

The NAS shall validate user amendments to proposed flight plans.

The NAS shall validate specialist proposed flight plans.

The NAS shall validate specialist amendments to proposed flight plans.

The NAS shall validate classified flight plans with security classifications up to and including secret.

The NAS shall validate flight plans in NAS format.

The NAS shall validate flight plans in ICAO format.

The NAS shall evaluate a proposed flight plan prior to acceptance.

The NAS shall evaluate an amendment prior to acceptance.

The NAS shall assign flight plans that adhere to metering restrictions.

The NAS shall assign flight plans that adhere to flow restrictions.

The NAS shall assign flight plans that avoid severe weather problems.

The NAS shall assign flight plans based on airspace restrictions.

The NAS shall schedule low-level routes for use by military users.

The NAS shall process and validate user proposed flight plans within a means response time of 4.0 seconds of receipt.

The NAS shall process and validate user proposed flight plans within a 99th percentile response time of 6.0 seconds of receipt.

The NAS shall process and validate user proposed flight plans within a within a maximum response time of 12.0 seconds of receipt.

The NAS shall process and validate user amendments to proposed flight plans within a means response time of 4.0 seconds of receipt.

The NAS shall process and validate user amendments to proposed flight plans within a 99th percentile response time of 6.0 seconds of receipt.

The NAS shall process and validate user amendments to proposed flight plans within a maximum response time of 12.0 seconds of receipt.

The NAS shall process and validate specialist proposed flight plans within a means response time of 4.0 seconds of receipt.

The NAS shall process and validate specialist proposed flight plans within a 99th percentile response time of 6.0 seconds of receipt.

The NAS shall process and validate specialist proposed flight plans within a maximum response time of 12.0 seconds of receipt.

The NAS shall process and validate specialist amendments to proposed flight plans within a means response time of 4.0 seconds of receipt.

The NAS shall process and validate specialist amendments to proposed flight plans within a 99th percentile response time of 6.0 seconds of receipt.

The NAS shall process and validate specialist amendments to proposed flight plans within a maximum response time of 12.0 seconds of receipt.

The NAS shall store flight plans in ICAO format.

The NAS shall convert ICAO flight plans into NAS format.

The NAS shall convert NAS flight plans into ICAO format

The NAS shall store classified flight plans with security classifications up and including to secret.

The NAS shall store classified route proposals with security classifications up to and including secret.

The NAS shall store unclassified flight plans from military scheduling activities.

The NAS shall store unclassified route proposals from military scheduling activities.

The NAS shall compare proposed flight plans against known NAS constraints.

#### 3.1.1.2.1 Detect Errors in Flight Plans

The NAS shall detect errors in flight plans.

The NAS shall notify users of problems with proposed flight plans.

The NAS shall notify the specialist with the reason(s) for rejection of a flight plan.

The NAS shall notify the user with the reason(s) for rejection of a flight plan.

The NAS shall notify specialists of errors in a proposed flight plan.

#### 3.1.1.2.2 Validate classified flight plans from military scheduling activities

The NAS shall validate classified flight plans from military scheduling activities.

The NAS shall validate classified flight plans from military scheduling activities.

#### 3.1.1.2.3 Validate unclassified flight plans from military scheduling activities

The NAS shall validate unclassified flight plans from military scheduling activities.

The NAS shall validate unclassified flight plans from military scheduling activities.

#### 3.1.1.2.4 Validate low level routes for military users

The NAS shall validate more than 1000 low level routes for military users.

The NAS shall validate no less than 1000 low-level routes for military users.

#### 3.1.1.2.5 Process pre-filed flight plans in time sequence

The NAS shall process pre-filed flight plans in time sequence.

The NAS shall store pre-filed flight plans in time sequence.

#### 3.1.1.2.6 Store classified flight plans

The NAS shall store classified flight plans with security clearances up to and including SECRET from military scheduling activities.

The NAS shall store classified route proposals with security clearances up to and including SECRET from military scheduling activities.

#### 3.1.1.3 Assist preparations for conducting flight

The NAS shall assist preparations for conducting flight.

The NAS shall disseminate formatting information to allow users to file flight plans via external data interfaces.

The NAS shall establish formatting information to allow users to file flight plans.

The NAS shall disseminate formatting information to allow users to file flight plans via external data interfaces.

The NAS shall disseminate NAS preferred routes.

The NAS shall store recurring flight plans.

The NAS shall store the original flight plan request.

The NAS shall store pre-filed flight plans.

The NAS shall establish direct access with users within 5 seconds after connection has been made.

The NAS shall prepare preflight and in-flight briefings.

The NAS shall conduct preflight and in-flight briefings.

The NAS shall disseminate aeronautical information to users to support flight planning.

#### 3.1.1.3.1 Provide a method to utilize commonly used flight plan information

The NAS shall provide a method to utilize commonly used flight plan information (e.g. preferred routes and standard aircraft profiles) without re-entering such information for every flight plan.

The NAS shall store repetitive information when a user is submitting multiple flight plans.

The NAS shall access repetitive information when a user is submitting multiple flight plans.

#### 3.1.1.3.2 Disseminate proposed flight information to traffic management specialists

The NAS shall disseminate active flight information to traffic management specialists at the Air Traffic Control Systems Command Center (ATCSCC).

The NAS shall notify users of the schedules for airspace usage.

The NAS shall notify specialists of the schedules for airspace usage.

#### 3.1.1.3.3 Disseminate weather information to users to support flight planning

The NAS shall disseminate weather information to users to support flight planning.

The NAS shall disseminate weather information from reporting stations within the specified corridor of the requested route.

The NAS shall disseminate weather information specific to pre-defined areas less than or equal to 100 miles from a specific location or other predefined identifier.

The NAS shall retrieve route-oriented weather information for corridors up to 200 miles wide.

The NAS shall disseminate route-oriented weather information for corridors up to 200 miles wide.

### 3.1.2 Flight Data Management

The NAS shall maintain flight-planning data archives

#### 3.1.2.1 Process flight plan data

The NAS shall process flight plan data from all users.

The NAS shall acquire validated flight plans and amendments from NAS facilities including Flight Service Stations, Air Route Traffic Control Centers, Air Traffic Control Towers, Military Base Operations, and users.

The NAS shall process flight plan information to meet required NAS response times during peak demand.

The NAS shall process identification information received from aircraft in remote areas.

The NAS shall accept opening of a flight plan by authorized specialists.

The NAS shall accept the activation of a flight plan by authorized specialists.

The NAS shall acquire flight plan information for each controlled aircraft in controlled airspace.

The NAS shall acquire flight plan information for each controlled aircraft about to enter controlled airspace within a locally adaptable time or distance.

The NAS shall activate flight plans following the issuance of a clearance for flight.

#### 3.1.2.1.1 Validate and process active flight plans

The NAS shall validate and process active flight plans within a maximum time of 6.0 seconds.

The NAS shall validate and process active flight plans within a means time of 1.5 seconds.

The NAS shall validate and process active flight plans within a 99th percentile time of 3.0 seconds.

The NAS shall validate and process active flight plans route amendments within a means time of 0.6 seconds.

The NAS shall validate and process active flight plans route amendments within a 99th percentile time of 1.2 seconds.

The NAS shall validate and process active flight plans route amendments within a maximum time of 3.0 seconds.

The NAS shall validate and process active flight plan probe trial-amendments within a means time of 0.6 seconds.

The NAS shall validate and process active flight plan probe trial-amendments within a 99th percentile time of 1.2 seconds.

The NAS shall validate and process active flight plan probe trial-amendments within a maximum time of 3.0 seconds.

The NAS shall validate and process active flight plan amendments (excluding route amendments and probe trial-amendments) within a means time of 1.5 seconds.

The NAS shall validate and process active flight plan amendments (excluding route amendments and probe trial-amendments) within a 99th percentile time of 3.0 seconds.

The NAS shall validate and process active flight plan amendments (excluding route amendments and probe trial-amendments) within a maximum time of 6.0 seconds.

#### 3.1.2.1.2 Accept flight plans

The NAS shall accept flight plans.

##### 3.1.2.1.2.1 Accept all departure requests

The NAS shall accept all departure requests.

The NAS shall validate all departure requests.

The NAS shall validate departure requests.

The NAS shall process departure requests.

The NAS shall accept pre-flight departure requests from specialists.

The NAS shall accept pre-flight departure requests from users.

The NAS shall process pre-flight departure requests from specialists.

The NAS shall process pre-flight departure requests from users.

The NAS shall evaluate pre-flight departure requests from specialists.

The NAS shall evaluate pre-flight departure requests from users.

The NAS shall disseminate pre-flight departure requests information to users.

The NAS shall disseminate pre-flight departure requests information to specialists.

#### 3.1.2.1.2.2 Acquire NAS flight plan information

The NAS shall acquire NAS flight plan information.

The NAS shall disseminate flight plan clearances to users.

The NAS shall acquire ICAO flight plan information.

The NAS shall store ICAO flight plan information.

#### 3.1.2.1.3 Accept flight plans from users

The NAS shall accept flight plans from all users.

The NAS shall exchange ICAO flight plan information with users.

The NAS shall exchange ICAO flight plan information with specialists.

The NAS shall exchange NAS flight plan information with users.

The NAS shall assign flight plans based on preferential routes.

The NAS shall exchange NAS flight plan information with specialists.

The NAS shall exchange flight plan information with users through external user data interfaces.

The NAS shall accept automated flight plan information from adjacent non-NAS ATC facilities.

The NAS shall convert international flight plan information to other agreed upon formats.

The NAS shall accept automated hand-offs from adjacent non-NAS ATC facilities.

The NAS shall process flight plans submitted by search and rescue agencies.

The NAS shall process flight plans submitted by search and rescue aircraft.

#### 3.1.2.1.4 Validate flight plans

The NAS shall validate flight plans.

The NAS shall validate flight plan data from all users.

#### 3.1.2.2 Distribute flight plans

The NAS shall distribute flight plans to appropriate ATC facilities along the route of flight.

The NAS shall disseminate flight information to users.

The NAS shall disseminate flight plans to users.

The NAS shall disseminate flight data summaries to specialists.

The NAS shall disseminate flight data summaries to users.

The NAS shall alert the specialist of any amendments to flight plans prior to handoff acceptance.

#### 3.1.2.2.1 Disseminate flight information

The NAS shall disseminate flight information to specialists.

The NAS shall display flight plan information for more than 100 aircraft per oceanic sector.

The NAS shall display flight plan information for at least 50 aircraft per non-oceanic sector.

#### 3.1.2.2.2 Disseminate flight plan information to NAS facilities

The NAS shall disseminate flight plan information to all NAS facilities that provide control/support to the flight.

The NAS shall disseminate flight plan information to affected Military air traffic control facilities.

The NAS shall disseminate flight plan information to affected NAS air traffic control facilities.

#### 3.1.2.2.3 Disseminate flight plan information to adjacent non-NAS ATC facilities

The NAS shall disseminate flight plan information to adjacent non-NAS ATC facilities that provide control/support to the flight.

The NAS shall disseminate flight plan information to affected adjacent non-NAS adjacent air traffic control facilities.

The NAS shall disseminate flight plan information to adjacent non NAS ATC facilities within the time frame specified by international and bilateral agreements.

#### 3.1.2.2.4 Disseminate departure requests

The NAS shall disseminate departure requests.

The NAS shall disseminate departure requests to specialist at an adaptable time prior departure.

The NAS shall disseminate departure requests to appropriate specialists.

The NAS shall disseminate departure request information.

#### 3.1.2.2.5 Disseminate flight plan information to users via external data interfaces

The NAS shall disseminate flight plan information to users via external data interfaces.

The NAS shall disseminate flight plan information to users via air-ground data communications.

The NAS shall disseminate flight plan information to users via air-ground voice communications.

The NAS shall disseminate flight plan information through user external data interfaces.

#### 3.1.2.3 Maintain knowledge of the flight plan's status

The NAS shall maintain knowledge of the flight plan's status (active, cancelled, or closed.)

The NAS shall update flight plans based on current position.

The NAS shall update flight plans based on in-flight amendments.

The NAS shall maintain knowledge of the flight plan's trajectory.

The NAS shall maintain knowledge of detected deviations from the active flight plan.

The NAS shall store NAS flight plan information.

The NAS shall store flight plans in NAS format.

The NAS shall store all departure requests.

The NAS shall store more than 1000 low level routes for military users.

The NAS shall update stored flight information within 12.0 seconds of receiving new flight information.



#### 3.1.2.4 Process flight plan amendments

The NAS shall process flight plan amendments.

The NAS shall process airspace reservation amendments submitted by aircraft.

The NAS shall process airspace reservation amendments submitted by search and rescue agencies.

The NAS shall process a user request to transition from VFR to IFR.

The NAS shall update active flight plans when amendments are accepted immediately.

The NAS shall process flight plan amendments submitted by search and rescue agencies.

The NAS shall process flight plan amendments submitted by search and rescue aircraft.

The NAS shall notify users of any problems with flight plan amendments.

##### 3.1.2.4.1 Provide flight following services

The NAS shall provide flight following services.

The NAS shall provide various degrees of flight following service.

##### 3.1.2.4.1.1 Accept requests for flight following services

The NAS shall accept requests for flight following services.

The NAS shall accept requests for flight following services of aircraft out of surveillance coverage.

The NAS shall accept requests for flight following services of aircraft in surveillance coverage.

The NAS shall accept requests for flight following in all weather conditions.

##### 3.1.2.4.1.2 Acquire the active flight plan for a user requesting flight following services

The NAS shall acquire the active flight plan if filed, for a user requesting flight following services.

The NAS shall update speed from aircraft obtaining flight following services.

The NAS shall update position from aircraft obtaining flight following services.

The NAS shall store routing information from aircraft obtaining flight following services.

The NAS shall store altitude from aircraft obtaining flight following services.

The NAS shall store speed from aircraft obtaining flight following services.

The NAS shall acquire routing information from aircraft obtaining flight following services.

The NAS shall acquire altitude from aircraft obtaining flight following services.

The NAS shall acquire speed from aircraft obtaining flight following services.

The NAS shall update routing information from aircraft obtaining flight following services.

The NAS shall update altitude from aircraft obtaining flight following services.

The NAS shall store position from aircraft obtaining flight following services.

The NAS shall acquire position from aircraft obtaining flight following services.

The NAS shall acquire identification from aircraft obtaining flight following services.

The NAS shall store identification from aircraft obtaining flight following services.

The NAS shall retrieve the active flight plan for a user requesting flight following services.

The NAS shall amend the active flight plan for a user requesting flight following services.

#### 3.1.2.4.2 Accept flight plan amendments

The NAS shall accept flight plan amendments.

The NAS shall accept amendments from specialists on active flight plans.

The NAS shall accept proposed flight plan amendments from specialists.

The NAS shall accept proposed flight plan amendments from users.

The NAS shall accept amendments to active flight plans by authorized specialists.

The NAS shall accept flight plan amendments submitted by search and rescue agencies.

The NAS shall accept flight plan amendments submitted by search and rescue aircraft.

The NAS shall accept airspace reservation amendments submitted by search and rescue agencies.

#### 3.1.2.4.3 Evaluate flight plan amendments

The NAS shall evaluate flight plan amendments.

The NAS shall evaluate flight plan amendments submitted by search and rescue agencies.

The NAS shall evaluate flight plan amendments submitted by search and rescue aircraft.

#### 3.1.2.4.4 Validate flight plan amendments

The NAS shall validate flight plan amendments.

The NAS shall validate flight plan amendments submitted by search and rescue agencies.

The NAS shall validate flight plan amendments submitted by search and rescue aircraft.

#### 3.1.2.5 Process flight plan cancellations

The NAS shall process flight plan cancellations.

The NAS shall accept specialists' commands to cancel flight plans.

The NAS shall accept user requests to cancel flight plans.

#### 3.1.2.6 Process flight plan closures

The NAS shall process flight plan closures.

The NAS shall accept specialists' commands to close flight plans.

The NAS shall accept user requests to close flight plans.

### 3.2 ATC- Separation Assurance

#### 3.2.1 Aircraft to Aircraft Separation

##### 3.2.1.1 Aircraft trajectory processing

##### 3.2.1.1.1 Collect actual flight information

All aircraft entering an ADIZ shall be under surveillance at all times. The NAS shall be required to provide the current and expected location,

altitude, speed, and course of each aircraft. National security and law enforcement interests require a method to determine whether the aircraft is authorized or unauthorized. This capability must be available at all times. The NAS must provide a means of communication to support these requirements.

The NAS shall acquire actual flight information for each controlled aircraft in US delegated airspace.

The NAS shall acquire actual flight information for each controlled aircraft in US delegated airspace.

The NAS shall acquire actual flight information for each controlled aircraft inbound towards US delegated airspace within a locally adaptable distance from the NAS boundary.

The NAS shall acquire actual flight information for each controlled aircraft inbound towards US delegated airspace within a locally adaptable distance from the NAS boundary.

The NAS shall acquire actual flight information for each controlled aircraft inbound towards US delegated airspace within a locally adaptable time from the NAS boundary.

The NAS shall acquire actual flight information for each controlled aircraft inbound towards US delegated airspace within a locally adaptable time from the NAS boundary.

The NAS shall acquire actual flight information from aircraft outside of independent surveillance coverage.

The NAS shall acquire actual flight information for each controlled aircraft inbound towards US delegated airspace within a locally adaptable distance from the NAS boundary.

The NAS shall acquire information about aircraft operating outside of independent surveillance coverage.

The NAS shall detect aircraft in the conterminous United States airspace.

#### 3.2.1.1.1.1 Collect aircraft position information

The NAS shall acquire position reports from aircraft.

The NAS shall acquire data from approved communications media for dependent surveillance coverage.

The NAS shall update the estimated positions for aircraft operating outside of independent surveillance coverage at a minimum adapted time between updates of 1 minute.

The NAS shall update the actual flight position of each aircraft with a maximum time between updates of 13 seconds.

The NAS shall update the estimated current position of aircraft operating outside of independent surveillance coverage at a maximum adapted time between updates of 10 minutes.

The NAS shall determine the current altitude for each participating aircraft (in controlled airspace).

The NAS shall acquire the reported altitude for each controlled aircraft inside US delegated airspace to within 103 feet (68th percentile).

Exceptions to these requirements are permitted over areas where extraordinary measures would be required to provide coverage. In these areas, coverage shall be provided based upon consideration of the cost of providing surveillance and of air traffic in the area.

The NAS shall detect the position of aircraft in selected volumes of en route airspace independent of aircraft equipage

#### 3.2.1.1.1.1.1 Collect aircraft position information in U.S. defense zones

The NAS shall detect position of aircraft operating within an ADIZ within 0.125 NMI of actual position.

The NAS shall detect position of aircraft operating within an ADIZ within 0.176 degrees azimuth.

The NAS shall detect altitude of aircraft entering an ADIZ within 5000 feet of actual altitude.

The NAS shall detect intruders operating within an ADIZ.

The NAS shall detect all aircraft entering an ADIZ within 13 seconds of penetration.

The NAS shall detect aircraft operating within an Air Defense Identification Zone (ADIZ).

The NAS shall detect aircraft in the US Air Defense Identification Zone (ADIZ).

The NAS shall acquire position information of any aircraft operating within an ADIZ.

The NAS shall acquire altitude information of any aircraft operating within an ADIZ.

The NAS shall provide detection of any aircraft throughout an Air Defense Identification Zone (ADIZ) and the conterminous United States airspace.

The NAS shall detect aircraft entering an ADIZ up to and including 100,000 feet MSL, from ground level to +30 degrees relative to an earth tangential plane at the sensor site.

The NAS shall detect aircraft entering an ADIZ up to and including surface ranges of 250 nmi, from ground level to +30 degrees relative to an earth tangential plane at the sensor site.

#### 3.2.1.1.1.2 Collect aircraft position information from terminal airspace

The NAS shall detect the position of aircraft in terminal environments with an accuracy of 0.28 nmi (99th percentile).

The NAS shall detect aircraft in qualifying aerodromes, independent of aircraft equipage.

The NAS shall detect, to the ground, the position of aircraft in terminal areas, independent of aircraft equipage.

The NAS shall detect the position of aircraft in terminal transitions areas, independent of aircraft equipage.

The NAS shall acquire aircraft position information for separation of aircraft conducting simultaneous parallel approaches.

The NAS shall acquire position reports from properly equipped aircraft in selected terminal areas, to the ground.

The NAS shall acquire position reports from properly equipped aircraft in terminal transition areas.

The NAS shall process position reports from properly equipped aircraft in selected terminal areas, to the ground.

The NAS shall store the position of aircraft in terminal environments with an accuracy of 0.28 nmi (99th percentile).

The NAS shall store the position of aircraft in terminal areas that were detected, independent of aircraft equipage.

The NAS shall store the position of aircraft in terminal transitions area that were detected, independent of aircraft equipage.

The NAS shall store position information for aircraft that were detected independently of aircraft equipage in qualifying aerodromes.

The NAS shall determine if an aircraft is in position for takeoff on the proper runway at designated aerodromes during period of reduced visibility.

The NAS shall provide the capability to allow air traffic control towers to operate independently of their parent ARTCC in the event of an ARTCC failure. These towers which receive surveillance data shall be capable of expanding their display range (within the limits of available processing capacity) beyond that used in normal operation.

#### 3.2.1.1.1.3 Collect Aircraft position information from en route airspace

The NAS shall detect aircraft position to within 2.04 nmi (99th percentile) of the actual position over the ground for en route aircraft.

The NAS shall detect each controlled aircraft in US delegated airspace.

The NAS shall acquire aircraft position in the en route environment.

The NAS shall acquire position reports from properly equipped aircraft in selected volumes of en route airspace.

The NAS shall store aircraft position to within 2.04 nmi (99th percentile) of the actual position over the ground for en route aircraft.

The NAS shall store the position of aircraft in selected volumes of en route airspace that were detected, independent of aircraft equipage

The NAS shall store the position of aircraft in the en route environment.

The NAS shall estimate the current position of aircraft operating outside of independent surveillance coverage.

The NAS shall process position reports received from aircraft in remote areas.

#### 3.2.1.1.1.2 Determine aircraft ground speed

The NAS shall determine the speed of each controlled aircraft in US delegated airspace to within 20 knots (peak RMS value) of the aircraft's speed straight-line-and-level flight at constant speed.

The NAS shall determine the speed of each controlled aircraft in US delegated airspace to within 60 knots (peak RMS value) of the true speed during aircraft acceleration in level flight.

The NAS shall store the speed of each controlled aircraft in US delegated airspace to within 20 knots (peak RMS value) of the aircraft's speed during straight-line-and-level flight at constant speed.

The NAS shall store the speed of each controlled aircraft in US delegated airspace to within 60 knots (peak RMS value) of true speed during aircraft acceleration in level flight.

The NAS shall store the speed of each controlled aircraft in US delegated airspace to within 20 knots (peak RMS value) of the aircraft's true speed during straight-line-and-level flight at constant speed.

#### 3.2.1.1.1.2.1 Determine aircraft ground speed in U.S. defense zones

The NAS shall acquire ground speed information of any aircraft operating within an ADIZ.

The NAS shall detect speed of aircraft entering an ADIZ within 20 knots of actual speed.

#### 3.2.1.1.1.2.2 Determine aircraft ground speed in terminal airspace

The NAS shall detect the speed of each controlled aircraft in terminal areas to within 10 knots (peak RMS value) of the aircraft's true speed during straight-line-and-level flight at constant speed.

The NAS shall detect the speed of each controlled aircraft in terminal areas to within 30 knots (peak RMS value) of true speed during aircraft acceleration in level flight.

The NAS shall store the speed of each controlled aircraft in terminal areas to within 10 knots (peak RMS value) of the aircraft's true speed during straight-line-and-level flight at constant speed.

The NAS shall store the speed of each controlled aircraft in terminal areas to within 30 knots (peak RMS value) of true speed during aircraft acceleration in level flight.

#### 3.2.1.1.1.3 Determine aircraft course

The NAS shall detect aircraft track accurate to within 5 degrees (99th percentile) of actual course.

The NAS shall store aircraft track to within 5 degrees (99th percentile) of actual course.

#### 3.2.1.1.1.3.1 Determine aircraft course in U.S. defense zones

The NAS shall detect course of aircraft entering an ADIZ within 5 degrees of actual course.

The NAS shall acquire course information of any aircraft operating within an ADIZ.

#### 3.2.1.1.2 Process actual flight information

The NAS shall retrieve actual flight information.

The NAS shall process actual flight information from aircraft outside of independent surveillance coverage.

The NAS shall process position reports from aircraft.

The NAS shall process position reports from properly equipped en route aircraft in selected volumes of en route airspace.

The NAS shall process en route area surveillance data within a maximum 3.0 seconds of its detection by the NAS.

The NAS shall process position reports from properly equipped aircraft in terminal transition areas.

#### 3.2.1.1.3 Distribute actual flight information

The NAS shall disseminate aircraft flight information for each controlled aircraft to specialists.

The NAS shall display actual flight information from aircraft outside of independent surveillance coverage.

The NAS shall display aircraft flight information about controlled aircraft.

#### 3.2.1.1.3.1 Disseminate aircraft position information

The NAS shall display identification information received from aircraft in remote areas within 15 seconds of receipt by the NAS.

The NAS shall display position reports received from aircraft in remote areas within 15 seconds of receipt by the NAS.

The NAS shall provide the capability to supply surveillance data to backup facilities for their respective backup areas.

The NAS shall display position reports from aircraft.

The NAS shall disseminate the reported altitude for each controlled aircraft inside US delegated airspace to within 103 feet (68th percentile).

##### 3.2.1.1.3.1.1 Disseminate the position aircraft in terminal airspace

The NAS shall display the position of aircraft in terminal environments with an accuracy of 0.28 nmi (99th percentile).

The NAS shall disseminate, to specialists, the position of aircraft in terminal areas that were detected, independent of aircraft equipage.

The NAS shall disseminate, to specialists, the position of aircraft in terminal transitions areas that were detected, independent of aircraft equipage.

The NAS shall display the positions of VFR aircraft in the terminal arrival phase of flight.

The NAS shall display aircraft position information for separation of aircraft conducting simultaneous parallel approaches.

The NAS shall display position information, to specialists, for aircraft that were detected independent of aircraft equipage in qualifying aerodromes.

The NAS shall display terminal area surveillance data to specialists within a maximum of 2.2 seconds of its detection by the NAS.

##### 3.2.1.1.3.1.2 Disseminate the position of aircraft in en route airspace

The NAS shall display en route area surveillance data to specialists within a maximum 3.0 seconds of its detection by the NAS.

The NAS shall disseminate, to specialists, the position of aircraft in selected volumes of en route airspace that were detected, independent of aircraft equipage.

#### 3.2.1.1.3.2 Disseminate aircraft speed information

The NAS shall display the speed of each controlled aircraft in US delegated airspace to within 20 knots (peak RMS value) of the aircraft's true speed during straight-line-and-level flight at constant speed.

The NAS shall display the speed of each controlled aircraft in US delegated airspace to within 60 knots (peak RMS value) of true speed during aircraft acceleration in level flight.

##### 3.2.1.1.3.2.1 Disseminate the speed of aircraft in terminal airspace

The NAS shall display the speed of each controlled aircraft in terminal areas to within 10 knots (peak RMS value) of the aircraft's speed over the ground during straight-line-and-level flight at constant speed.

The NAS shall display the speed of each controlled aircraft in terminal areas to within 30 knots (peak RMS value) of true speed during aircraft acceleration in level flight.

#### 3.2.1.1.3.3 Disseminate the course of aircraft

The NAS shall display aircraft track to within 5 degrees (99th percentile) of actual course.

#### 3.2.1.1.4 Generate aircraft trajectories



The NAS shall correlate actual flight information to flight plan information for each controlled aircraft.

The NAS shall revise the clearance-based trajectory of existing flight trajectories.

The NAS shall generate clearance-based trajectories across physical ATC facility boundaries for interfacility flights.

The NAS shall project aircraft positions by an adapted look-ahead time interval.

The NAS shall project the flight path of known traffic within US delegated airspace.

The NAS shall project the flight path of known traffic entering US delegated airspace.

#### 3.2.1.1.4.1 Generate aircraft trajectories based on actual flight information

The NAS shall generate a flight trajectory for each controlled aircraft in US delegated airspace based on actual flight information.

The NAS shall project aircraft flight path based on actual flight information.

The NAS shall project the flight path of detected aircraft up to a maximum of two minutes into the future, based on the operational environment.

The NAS shall project each aircraft's flight path at least every 13 seconds.

The NAS shall update each aircraft's flight path at least every 13 seconds.

The NAS shall update flight path projections at least once per surveillance equipment scan interval.

#### 3.2.1.1.4.2 Generate aircraft trajectories based on flight plan route

The NAS shall generate a flight trajectory for each controlled aircraft in US delegated based on flight plan information.

The NAS shall project a detailed four-dimensional trajectory corresponding to the entire flight plan as amended.

The NAS shall generate flight trajectories that include all segments of controlled aircraft flight plans as originally filed.

The NAS shall generate flight trajectories that include all segments of controlled aircraft flight plans as amended.

The NAS shall generate clearance-based trajectories for controlled aircraft with valid flight plans.

The NAS shall generate clearance-based trajectories for controlled aircraft that conform to all segments of an aircraft's flight plan route clearances.

The NAS shall assist specialists in generating flight plan based trajectories for flight plans as originally filed.

The NAS shall assist specialists in generating flight plan-based trajectories for flight plans as amended.

The NAS shall assist specialists in constructing flight plan-based trajectories that corresponding to each route segment of the flight plan.

The NAS shall assist specialists in maintaining flight-plan based trajectories that corresponding to each route segment of the flight plan.

The NAS shall project flight trajectories for all controlled aircraft in US delegated airspace for not less than 20 minutes in advance.

The NAS shall project flight trajectories for all controlled aircraft expected to enter US delegated airspace for not less than 20 minutes in advance.

The NAS shall support flight trajectory prediction with weather conditions.

#### 3.2.1.2 Separate Aircraft

The NAS shall separate aircraft operating outside the independent surveillance environment when this traffic is using supplemental navigation systems.

The NAS shall disseminate clearances to users to ensure that separation is maintained.

##### 3.2.1.2.1 Continuity of aircraft separation service

The NAS shall ensure the continuity of aircraft separation services.

The NAS shall ensure continuous detection of aircraft-aircraft separation standards violations for current clearance-based trajectories.

The NAS shall transfer control responsibilities for a controlled aircraft from one jurisdiction to the next.

The NAS shall transfer control responsibilities for a controlled aircraft with no loss of separation services.

#### 3.2.1.2.1.1 Continuity of aircraft collision avoidance service

The NAS shall support the collision avoidance capability on a continuous basis.

The NAS shall assure continuous assessment of aircraft collision risk.

#### 3.2.1.2.2 Establish aircraft separation standards

The NAS shall establish aircraft minimum separation standards based on an aircraft's operational environment.

The NAS shall alert the specialists in sufficient time to allow them to take corrective actions to preclude breaches of separation standards. The NAS shall predict a possible breach and alert specialists at least 80 seconds before the breach of separation occurs inside of, within 5 nautical miles of, and within 500 feet below or 500 feet above military Special Use Airspace.

The flight path projection shall be of sufficient lead-time to allow collision prediction, maneuver determination, ranking of alternatives, specialist analysis, communications with the affected flight(s), flight crew reaction, and aircraft maneuvering.

The NAS shall project aircraft positions by look-ahead times that are sufficient to allow avoidance actions to be taken without causing further conflicts.

The NAS shall restrict the number of nuisance conflict alerts to no more than 6 percent of all alerts declared for any realistic traffic mix.

The NAS shall distinguish between designated functional category levels of altitude assignments on displays.

The NAS shall comply with separation standards for aircraft on simultaneous parallel runway approaches.

#### 3.2.1.2.3 Separate aircraft operating under clearances

The NAS shall generate clearances that ensure appropriate separation for the type of aircraft flown.

The NAS shall generate flight plan clearances.

The NAS shall generate clearances that ensure appropriate separation of aircraft for the specific route of flight.

The NAS shall separate controlled aircraft on simultaneous parallel runway approaches.

The NAS shall detect actual compliance to simultaneous parallel approach runway separation standards by controlled aircraft.

The NAS shall detect aircraft-to-aircraft separation standards violations.

The NAS shall provide alternate clearances to participating aircraft to prevent aircraft-to-aircraft separation violation.

##### 3.2.1.2.3.1 Separate aircraft within close proximity to military special use airspace.

The NAS shall provide aircraft-to-aircraft separation service to participating aircraft within close proximity to military special use airspace.

##### 3.2.1.2.3.2 Inhibit separation between MARSAs

The NAS shall accept specialists request to inhibit aircraft-to-aircraft separation violation alerts between MARSAs.

The NAS shall inhibit alerts associated with separation violations between military aircraft participating in the same Altitude Reservation (ALTRV) formation.

The NAS shall inhibit alerts associated with actual separation violations between military aircraft participating in the same Military Accepts Responsibility for Separation of Aircraft (MARSA) event.

The NAS shall inhibit aircraft-to-aircraft separation violation alerts between MARSA aircraft.

#### 3.2.1.2.4 Monitor aircraft separation

The NAS shall detect all potential conflicts with an amended flight plans within a maximum time of 6.0 seconds of amendment validation.

The NAS shall detect all potential conflicts with an amended flight plans within a means time of 1.5 seconds of amendment validation.

The NAS shall detect all potential conflicts with an amended flight plans within the 99 percentile time of 3.0 seconds of amendment validation.

The NAS shall assess the risk of collision for all tracked aircraft irrespective of the surrounding airspace structure boundaries.

The NAS shall compare the flight path projection of each aircraft at least 20 minutes in advance of potential conflicts.

The NAS shall evaluate trial altitude reservations for potential conflicts with approved altitude reservations.

The NAS shall evaluate pending altitude reservations for potential conflicts with approved altitude reservations.

The NAS shall evaluate the potential for conflicts with other aircraft resulting from the execution of each resolution maneuver considered.

The NAS shall monitor participating aircraft within close proximity to special use airspace.

The NAS shall monitor all metering generated recommendations for aircraft conflicts.

The NAS shall display actual simultaneous parallel approach runway separation conformance information.

#### 3.2.1.2.5 Detect violations of aircraft separation standards

The NAS shall detect violations of aircraft-aircraft separation standards for current clearance-based trajectories within predetermined time limits.

The NAS shall detect problems in the clearances of aircraft outside of independent surveillance coverage.

The NAS shall detect imminent collision threats between controlled aircraft and any other known aircraft.

##### 3.2.1.2.5.1 Predicted violations of aircraft separation standards

The NAS shall detect potential violations of aircraft separation standards.

The NAS shall detect potential aircraft violations of separation standards.

The NAS shall detect potential violations of aircraft separation standards.

The NAS shall detect possible aircraft-to-aircraft separation violations by participating aircraft within close proximity to military special use airspace.

The NAS shall predict possible aircraft-to-aircraft separation violations by participating aircraft within close proximity to a military special use airspace based on the clearance-based trajectory.

The NAS shall predict possible aircraft-to-aircraft separation violations by participating aircraft within close proximity to military special use airspace based on actual flight information trajectory.

The NAS shall predict possible conflicts within a 20-minute look-ahead time along flight plan routes.

The NAS shall generate the time until aircraft violations of separation standards.

##### 3.2.1.2.5.2 Detect current violations of aircraft separation standards

The NAS shall detect actual violations of simultaneous parallel approach runway separation standards by controlled aircraft.

The NAS shall detect actual aircraft violations of separation standards.

The NAS shall detect current violations of aircraft separation standards.

#### 3.2.1.2.6 Disseminate aircraft separation standards violation information

#### 3.2.1.2.6.1 Disseminate predicted aircraft separation standards violations information

The NAS shall disseminate to specialists, the call sign of each positively identified aircraft for which a collision prediction is made.

The NAS shall disseminate the time until aircraft violations of separation standards.

The NAS shall alert specialists when the projected flight path of a controlled aircraft and that of any other aircraft are predicted to have less than standard minimum separation.

The NAS shall alert specialists to a potential loss of separation prior a violation of minimum separation standards.

The NAS shall alert specialists of detected violations of aircraft-aircraft separation standards.

The NAS shall alert responsible specialist immediately following the prediction of a potential collision.

The NAS shall alert specialists of imminent collisions within a mean response time of 0.6 seconds of the initial prediction.

The NAS shall alert specialists of imminent collisions within a 99th percentile response time of 1.2 seconds of the initial prediction.

The NAS shall alert specialists of imminent collisions within a maximum response time of 3.0 seconds of the initial prediction.

The NAS shall alert specialists of predicted aircraft-to-aircraft separation violations by participating aircraft within close proximity to military special use airspace within 80 seconds of the actual violation.

The NAS shall notify all concerned specialist about actual aircraft violations of separation standards.

The NAS shall notify all concerned specialists about potential aircraft violations of separation standards.

The NAS shall display problems identified in alternate clearances to the requesting specialist.

##### 3.2.1.2.6.1.1 Disseminate predicted en route aircraft separation standards violation information.

The NAS shall alert specialist of potential violations of aircraft separation standards in en route areas at least 80 seconds prior to the predicted event.

The NAS shall alert specialists of potential violations of aircraft separation standards in en route airspace volumes that are outside an immediate aerodrome area at least 80 seconds prior to the predicted event.

##### 3.2.1.2.6.1.2 Disseminate predicted terminal airspace aircraft separation standards violation information.

The NAS shall alert specialist of potential violations of aircraft separation standards at least 30 seconds prior to the occurrence in terminal areas.

#### 3.2.1.2.7 Resolve violations of separation standards

The NAS shall resolve problems in clearances of aircraft outside of independent surveillance coverage.

The NAS shall implement all conflict resolution process steps within the appropriate aircraft-position look-ahead intervals.

The NAS shall process trial flight plans.

The NAS shall generate alternate flight trajectories to resolve predicted violations of aircraft-to-aircraft separation standards.

The NAS shall generate alternate flight trajectories to resolve current violations to aircraft-to-airspace separation standards.

The NAS shall assist specialists in processing alternate clearances.

The NAS shall identify alternate clearances.

##### 3.2.1.2.7.1 Evaluate aircraft conflict resolution alternatives

The NAS shall evaluate alternate flight trajectories for suitability to aircraft-to-aircraft separation standards.

The NAS shall evaluate the immediate threat of an imminent conflict to involved aircraft.

The NAS shall generate recommended conflict avoidance maneuvers based on the type of separation violation.

The NAS shall generate recommended conflict avoidance maneuvers based on the performance characteristics of the aircraft involved.

The NAS shall generate recommended conflict avoidance maneuvers based on the potential effects of the maneuvers on other aircraft in the system.

The NAS shall generate aircraft collision avoidance maneuvers.

The NAS shall generate resolution advisories that maintain standard separation for a minimum 2 minutes interval.

The NAS shall consider the imminence of conflict for aircraft involved in an imminent conflict.

The NAS shall consider the current maneuver status of aircraft involved in an imminent conflict.

The NAS shall consider the performance capabilities of aircraft involved in an imminent collision.

The NAS shall rank order possible maneuver(s) for each positively identified aircraft involved in a predicted collision.

The NAS shall be capable of assisting specialists in determining the impact of the avoidance actions and modifying the avoidance actions if required to maintain safe separation in the affected sectors.

The NAS shall evaluate aircraft maneuvers for collision avoidance for one or more aircraft upon prediction of a collision.

The NAS shall reject aircraft collision avoidance maneuvers that create new conflict situations.

#### 3.2.1.2.7.2 Disseminate aircraft conflict resolution information

The NAS shall generate resolution advisories for aircraft in violation of aircraft-aircraft separation standards.

The NAS shall display resolutions identified in alternate clearances to the requesting specialist.

The NAS shall display the highest-ranking problem resolution to specialists for clearances problems of aircraft outside of independent surveillance.

The NAS shall display at least one recommended maneuvers for each aircraft involved a predicted collision.

The NAS shall select and display a recommended avoidance vector to specialist for aircraft in predicted conflicts within a maximum response time of 3.0 seconds of detection.

The NAS shall select and display a recommended avoidance vector to specialists for aircraft in predicted conflicts within a mean response time of 0.6 seconds of detection.

The NAS shall select and display a recommended avoidance vector to specialists for aircraft in predicted conflicts within a 99th percentile response time of 1.2 seconds of detection.

The NAS shall select and display recommended airspace avoidance maneuvers for aircraft predicted to penetrate special use airspace.

The NAS shall disseminate recommended collision avoidance maneuvers to users.

The NAS shall disseminate resolution advisories for aircraft in violation of aircraft-aircraft separation standards to specialists.

The NAS shall display recommended avoidance maneuvers to specialists within a mean response time of 0.6 seconds of the initial prediction of a collision.

The NAS shall display recommended avoidance maneuvers to specialists within a within a 99th percentile response time of 1.2 seconds of the initial prediction of a collision.

The NAS shall display recommended avoidance maneuvers to specialists within a maximum response time of 3.0 seconds of the initial prediction of a collision.

#### 3.2.1.3 Monitor flight plan conformance

The NAS shall monitor clearance conformance of aircraft.

The NAS shall monitor adherence of aircraft to their clearances.

The NAS shall disseminate reminders to the specialist for each designated maneuver point in the current flight trajectory.

#### 3.2.1.4 Detect flight plan non-conformance

The NAS shall alert specialists when a controlled aircraft's track position is outside of the preset altitude conformance bounds of its current flight trajectory model.

The NAS shall alert the specialist when a controlled aircraft's track position is outside of the preset conformance bounds of its clearance-based trajectory in the lateral direction.

The NAS shall alert the specialist when a controlled aircraft's track position is outside of the preset lateral conformance bounds of its current clearance-based trajectory.

The NAS shall alert the specialist when a controlled aircraft's track position is outside of the preset conformance bounds of its clearance-based trajectory in the vertical direction.

The NAS shall notify users of non-adherence to ATC clearance within 10 seconds of the detection of the deviation.

The NAS shall notify specialists when aircraft under their control deviate from their flight plan clearance by a prescribed amount.

#### 3.2.1.5 Generate flight plan conformance resolutions

The NAS shall generate clearance re-conformance.

The NAS shall assist specialists in determining course correction necessary to reestablish lateral conformance of a controlled aircraft that have deviated from its cleared route of flight.

The NAS shall assist specialists in reestablishing clearance-based trajectory conformance when the predicted longitudinal position along the route differs from the current longitudinal position along the route by a predetermined amount.

The NAS shall notify users when their aircraft deviates from its flight plan clearance by a prescribed amount.

#### 3.2.2 Aircraft-Terrain-Obstacle Separation

Safe operation requires that aircraft maintain specific distances from the ground, mountainous terrain, and man-made obstacles (such as buildings, antenna towers, and overhead lines). Although maintaining appropriate clearance is ultimately the responsibility of the user, the NAS is required to provide assistance.

The NAS shall assist users in avoiding collisions with obstacles.

The NAS shall assist users in avoiding collisions with terrain.

The NAS shall assist users in avoiding collisions with the ground.

##### 3.2.2.1 Maintain current terrain information

The NAS shall acquire ground elevation information for the continental U.S. in grid form, compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall acquire ground information compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall acquire information about the ground throughout the area of NAS responsibility that is compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall acquire terrain elevation information compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall acquire terrain elevation information for the continental U.S. in grid form compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall acquire terrain information compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall acquire information about terrain throughout the area of NAS responsibility compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall store information about the ground throughout the area of NAS responsibility compliant with terrain, ground and obstacle



information accuracy requirements.

The NAS shall store ground elevation information for the continental U.S. in grid form compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall store ground information compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall store ground grid point elevation data compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall store information about terrain throughout the area of NAS responsibility compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall store terrain elevation data compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall store terrain elevation information for the continental U.S. in grid form compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall store terrain information compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall update information about the ground throughout the area of NAS responsibility compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall update ground elevation information for the continental U.S. in grid form compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall update ground grid point elevation data compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall update information about terrain throughout the area of NAS compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall update terrain elevation data compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall update terrain elevation information for the continental U.S. in grid form compliant with terrain, ground and obstacle information accuracy requirements.

#### 3.2.2.2 Maintain current manmade obstacle information

The NAS shall acquire information on all man-made obstacles that are greater than 200 feet above the surrounding terrain, compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall acquire information about manmade obstacles throughout the area of NAS responsibility compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall acquire manmade obstacle information compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall store information on all man-made obstacles that are greater than 200 feet above the surrounding terrain compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall store manmade obstacle information compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall store information about manmade obstacles throughout the area of NAS responsibility compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall update information about manmade obstacles throughout the area of NAS compliant with terrain, ground and obstacle information accuracy requirements.

The NAS shall update information on all man-made obstacles that are greater than 200 feet above the surrounding terrain compliant with terrain, ground and obstacle information accuracy requirements.

#### 3.2.2.3 Disseminate terrain information

The NAS shall filter ground information based on selected geographic areas.

The NAS shall filter ground information based on route of flight.

The NAS shall filter terrain information based on route of flight.

The NAS shall filter terrain information based on selected geographic areas.

The NAS shall disseminate ground information in a visual format to specialists including the minimum altitude required to clear the ground.

The NAS shall disseminate ground information compliant with terrain, ground and obstacle information accuracy requirements, to users upon request.

The NAS shall disseminate ground information compliant with terrain, ground and obstacle information accuracy requirements, to specialists upon request.

The NAS shall disseminate terrain information compliant with terrain, ground and obstacle information accuracy requirements, to users upon request.

The NAS shall disseminate terrain information compliant with terrain, ground and obstacle information accuracy requirements, to specialists upon request.

The NAS shall disseminate terrain information in a visual format to specialists including the minimum altitude required to clear terrain.

The NAS shall disseminate filtered ground information to specialists.

The NAS shall disseminate filtered ground information to users.

The NAS shall disseminate filtered terrain information to specialists.

The NAS shall disseminate filtered terrain information to users.

The NAS shall display current ground information from throughout the NAS coverage area.

The NAS shall display ground information that includes ground elevation from throughout the NAS airspace.

The NAS shall display ground information that includes landmark information from throughout the NAS airspace.

The NAS shall display terrain information that includes landmark information from throughout the NAS airspace.

The NAS shall display current terrain information from throughout the NAS coverage area.

The NAS shall display terrain information that includes terrain elevation from throughout the NAS.

The NAS shall display geographical structure information to within .26 nmi (99th percentile) of its actual position.

The NAS shall display geographic information.

#### 3.2.2.4 Disseminate manmade obstacle information

The NAS shall disseminate manmade obstacle information compliant with terrain, ground and obstacle information accuracy requirements, to users upon request.

The NAS shall disseminate manmade obstacle information compliant with terrain, ground and obstacle information accuracy requirements, to specialists upon request.

The NAS shall disseminate manmade obstacle information in a visual format to specialists including the minimum altitude required to clear the obstacle.

The NAS shall disseminate filtered manmade obstacle information to users.

The NAS shall disseminate filtered manmade obstacle information to specialists.

The NAS shall filter manmade obstacle information based on route of flight.

The NAS shall filter manmade obstacle information based on selected geographic areas.

The NAS shall display current obstacle information from throughout the NAS coverage area.

The NAS shall display information about obstacles that affect minimum IFR vectoring altitudes.

The NAS shall display information about obstacles that constitute a hazard to aviation.

The NAS shall display aircraft position information in relation to displayed geographical structure information.

#### 3.2.2.5 Ensure continuity of aircraft-to-terrain/obstacle separation service

The NAS shall ensure continuous detection of aircraft-ground separation standards violations.

The NAS shall ensure continuous detection of aircraft-terrain separation standards violations.

The NAS shall ensure continuous detection of aircraft-obstacle separation standards violations.

#### 3.2.2.6 Establish aircraft separation standards from fixed obstructions

The NAS shall establish minimum en route safe altitudes for participating aircraft with flight plan clearances.

The NAS shall establish minimum safe altitudes in proximity to airport approach area for participating aircraft with flight plan clearances.

The NAS shall establish minimum safe altitudes for participating aircraft in airport departure areas.

The NAS shall predict aircraft encounters with manmade obstacles in time to prevent actual aircraft-obstacle separation violations.

#### 3.2.2.7 Detect violations of terrain/obstacle separation standards

The NAS shall use current data on the altitude of terrain within the area of NAS responsibility to determine proximity of aircraft to terrain and obstacles.

The NAS shall use current data on the altitude of obstructions within the area of NAS responsibility to determine proximity of aircraft to terrain and obstacles.

##### 3.2.2.7.1 Predict violations of aircraft-to-terrain/obstacle separation standards

The NAS shall predict aircraft encounters with the ground in time to prevent actual aircraft-ground separation violations.

The NAS shall predict aircraft encounters with terrain in time to prevent actual aircraft-terrain separation violations.

The NAS shall predict aircraft- ground separation standards violations based on current clearance based trajectories.

The NAS shall predict aircraft- terrain separation standards violations based on current clearance based trajectories.

The NAS shall predict aircraft- obstacle separation standards violations based on current clearance based trajectories.

The NAS shall predict aircraft- terrain separation standards violations based on imminent trajectories.

The NAS shall predict aircraft - ground separation standards violations based on imminent trajectories.

The NAS shall predict aircraft-obstacle separation standards violations based on imminent trajectories.

##### 3.2.2.7.1.1 Predict violations of aircraft-to-terrain/obstacle separation standards in terminal airspace.

The NAS shall predict aircraft encounters with the ground in terminal airspace in advance of the actual violation of separation standards.

The NAS shall predict aircraft encounters with terrain in terminal airspace in advance of the actual violation of separation standards.

The NAS shall predict manmade obstacle encounters in terminal airspace in advance of the actual violation of separation standards.

##### 3.2.2.7.1.2 Predict violations of aircraft-to-terrain/obstacle separation in en route airspace.

The NAS shall predict aircraft encounters with the ground in en route airspace in advance of the actual violation of separation standards.

The NAS shall predict aircraft encounters with terrain in en route airspace in advance of the actual violation of separation standards.

The NAS shall predict aircraft encounters with manmade obstacle in en route airspace in advance of the actual violation of separation standards.

##### 3.2.2.7.2 Detect current violations of aircraft-to-terrain/obstacle separation standards in en route airspace.

The NAS shall detect aircraft failures to maintain minimum safe altitude above the ground.

#### 3.2.2.7.3 Disseminate information on violations of aircraft-to-terrain/obstacle separation standards

The NAS shall alert users to predicted aircraft-ground separation standards violations.

The NAS shall alert users to predicted aircraft - terrain separation standards violations.

The NAS shall alert users to predicted aircraft -obstacle separation standards violations.

The NAS shall alert participating aircraft to predicted conflicts with obstructions within 10 seconds of prediction.

The NAS shall alert specialists to predicted aircraft - terrain separation standards violations.

The NAS shall alert specialists to predicted aircraft - ground separation standards violations.

The NAS shall alert specialists to predicted aircraft - obstacle separation standards violations.

The NAS shall disseminate aircraft identification with predicted aircraft- ground separation standards violation alerts.

The NAS shall disseminate aircraft identification with predicted aircraft - terrain separation standards violation alerts.

The NAS shall disseminate aircraft identification with predicted aircraft - obstacle separation standards violation alerts.

The NAS shall indicate the action priority of the alarm associated with predicted aircraft - ground separation standards violations.

The NAS shall indicate the action priority of the alarm associated with predicted aircraft - obstacle separation standards violations.

The NAS shall indicate the action priority of the alarm associated with predicted aircraft - terrain separation standards violations.

##### 3.2.2.7.3.1 Disseminate information on violations of aircraft-to-terrain/obstacle separation standards in terminal airspace

The NAS shall alert users of predicted aircraft-ground separation standards violations in terminal airspace at least 30 seconds in advance of the actual violation of separation standards.

The NAS shall alert users of predicted aircraft- terrain separation standards violations in terminal airspace at least 30 seconds in advance of the actual violation of separation standards.

The NAS shall alert users of predicted aircraft-obstacle separation standards violations in terminal airspace at least 30 seconds in advance of the actual violation of separation standards.

The NAS shall alert appropriate specialists of predicted aircraft- ground separation standards violations in terminal airspace at least 40 seconds in advance of the actual violation of separation standards.

The NAS shall alert appropriate specialists of predicted aircraft-terrain separation standards violations in terminal airspace at least 40 seconds in advance of the actual violation of separation standards.

The NAS shall alert appropriate specialists of predicted aircraft-obstacle separation standards violations in terminal airspace at least 40 seconds in advance of the actual violation of separation standards.

##### 3.2.2.7.3.2 Disseminate information on violations of aircraft-to-terrain/obstacle separation standards in en route airspace.

The NAS shall alert users of predicted aircraft-ground separation standards violations in en route airspace at least 30 seconds in advance of the actual violation of separation standards.

The NAS shall alert users of predicted aircraft-terrain separation standards violations in en route airspace at least 65 seconds in advance of the actual violation of separation standards.

The NAS shall alert users of predicted aircraft-obstacle separation standards violations in en route airspace at least 65 seconds in advance of the actual violation of separation standards.

The NAS shall alert appropriate specialists of predicted aircraft-ground separation standards violations in en route airspace at least 75 seconds in advance of the actual violation of separation standards.

The NAS shall alert appropriate specialists of predicted aircraft- terrain separation standards violations in en route airspace at least 75 seconds in advance of the actual violation of separation standards.

The NAS shall alert appropriate specialists of predicted aircraft-obstacle separation standards violations in en route airspace at least 75 seconds in advance of the actual violation of separation standards.

#### 3.2.2.7.4 Generate resolutions to aircraft-to-terrain/obstacle separation violations

The NAS shall evaluate alternate clearance-based trajectories for potential aircraft-ground separation standards violations.

The NAS shall evaluate alternate clearance-based trajectories for potential aircraft - terrain separation standards violations.

The NAS shall evaluate alternate clearance-based trajectories for potential aircraft -obstacle separation standards violations.

The NAS shall consider local environment when generating avoidance maneuvers for predicted aircraft-ground separation standards violations.

The NAS shall consider local environment when generating avoidance maneuvers for aircraft-terrain separation standards violations.

The NAS shall consider local environment when generating avoidance maneuvers for predicted aircraft-obstacle separation standards violations.

The NAS shall generate aircraft maneuvers to avoid predicted aircraft-ground separation standards violations.

The NAS shall generate aircraft maneuvers to avoid predicted aircraft-terrain separation standards violations.

The NAS shall generate aircraft maneuvers to avoid predicted aircraft-obstacle separation standards violations.

#### 3.2.2.7.5 Disseminate resolutions to aircraft-to-terrain/obstacle separation violations

The NAS shall disseminate one or more recommended avoidance maneuver scenarios to specialists, for any aircraft predicted to violate aircraft-ground separation standards.

The NAS shall disseminate one or more recommended avoidance maneuver scenarios to specialists, for aircraft predicted to violation aircraft-terrain separation standards.

The NAS shall disseminate one or more recommended avoidance maneuver scenarios to specialists, for aircraft predicted to violate aircraft-obstacle separation standards.

The NAS shall disseminate recommended separation violation avoidance maneuver to specialists, within 5 seconds of a predicted violation of aircraft-ground separation standard.

The NAS shall disseminate recommended separation violation avoidance maneuvers to specialists within 5 seconds of a predicted violation of aircraft-terrain separation standards.

The NAS shall disseminate recommended separation violation avoidance maneuvers to specialists within 5 second of a predicted violation of aircraft-obstacle separation standards.

### 3.2.3 Aircraft-to-Airspace Separation

#### 3.2.3.1 Disseminate airspace structure information

The NAS shall display current special use airspace information from throughout the NAS coverage area.

#### 3.2.3.2 Monitor aircraft in close proximity to unauthorized airspace

The NAS shall monitor all metering generated recommendations for aircraft to airspace conflicts.

The NAS shall notify the controller when known traffic approaches special use airspace.

#### 3.2.3.3 Predict aircraft-to-airspace separation violations

The NAS shall analyze sequencing and spacing plans for aircraft intrusion into special use airspace.

The NAS shall predict a possible breach of separation standards with Military Special Use Airspace no less than 80 seconds before the breach occurs.

The NAS shall detect aircraft intrusion into special use airspace.

The NAS shall detect current clearance-based trajectories that are in noncompliance with airspace restrictions.

The NAS shall notify specialists of the time at which an aircraft is predicted to enter controlled airspace.

#### 3.2.3.4 Disseminate information on airspace separation violations

##### 3.2.3.4.1 Disseminate information on predicted airspace separation violations

The NAS shall alert receiving specialist that a tracked aircraft is within a system-adapted time from the specialist's airspace.

The NAS shall alert receiving specialist that a tracked aircraft is within a system-adapted distance from the specialist's airspace.

The NAS shall alert participating aircraft to predicted conflicts with special use airspace within 10 seconds of prediction.

##### 3.2.3.5 Resolve airspace separation violations

The NAS shall transfer track control upon acknowledgment by the receiving controller of acceptance of the transfer of control.

The NAS shall evaluate alternate flight trajectories for compliance to aircraft-to-airspace separation standards.

The NAS shall evaluate alternate flight trajectories for suitability to aircraft-to-airspace separation standards.

##### 3.2.3.5.1 Resolve airspace separation violation by military aircraft.

The NAS shall disseminate altitude alternatives to military mission planners for resolution of possible airspace conflicts.

The NAS shall evaluate altitude alternatives to resolve possible airspace conflicts among military operations.

The NAS shall disseminate departure time alternatives to military mission planners for resolution of possible airspace conflicts.

The NAS shall evaluate departure time alternatives to resolve possible airspace conflicts among military operations.

The NAS shall disseminate route of flight alternatives to military mission planners for resolution of possible airspace conflicts.

The NAS shall evaluate route of flight alternatives to resolve possible airspace conflicts among military operations.

#### 3.2.4 Surface Separation

The NAS shall filter airport display information at designated aerodromes based controller request.

##### 3.2.4.1 Fixed objects on airport surfaces

The NAS shall use map outlines of runways that are accurate to within 12 feet of the actual edges of the runways.

The NAS shall use map outlines of taxiways that are accurate to within 12 feet of the actual edges of the taxiways.

The NAS shall disseminate taxiway area outlines to specialists.

The NAS shall disseminate runway area outlines to specialists.

The NAS shall disseminate landing area outlines to specialists.

##### 3.2.4.2 Moving objects on airport surfaces

The NAS shall establish independent surveillance environments covering all surface movement areas of aerodromes.

##### 3.2.4.2.1 Collect information on surface vehicles

The NAS shall identify vehicles on airport movement areas at designated aerodromes within specified weather conditions.

The NAS shall determine the position of vehicles on airport movement areas at designated aerodromes within specified weather conditions.

The NAS shall store vehicle movement information for movement areas at designated aerodromes.

The NAS shall update vehicle movement information for movement areas at designated aerodromes.

The NAS shall distinguish classes of vehicles on aerodrome surface when they are separated by 40 feet in range, or 80 feet in azimuth at a range of up to 12,000 feet.

#### 3.2.4.2.2 Disseminate information on surface vehicles

The NAS shall disseminate vehicle movement information for movement areas at designated aerodromes.

The NAS shall display position data for vehicles on airport movement areas at designated aerodromes.

The NAS shall display alphanumeric data with the position of vehicles at designated aerodromes.

The NAS shall display the position of any vehicle to within 20 feet of its actual position on the airport movement areas of designated aerodromes.

#### 3.2.4.2.3 Collect information on aircraft on airport surface

The NAS shall determine the position of aircraft on airport movement areas at designated aerodromes within specified weather conditions.

The NAS shall detect all aircraft on movement areas at designated aerodromes in conditions up to 16 millimeters of precipitation per hour.

The NAS shall identify aircraft on airport movement areas at designated aerodromes within specific weather conditions.

#### 3.2.4.2.4 Disseminate information about aircraft on airport surface

The NAS shall display alphanumeric data with the position of an aircraft at designated aerodromes.

The NAS shall display the position of any aircraft to within 20 feet of its actual position on the airport movement areas of designated aerodromes.

The NAS shall display position data for aircraft on airport movement areas at designated aerodromes.

The NAS shall display aircraft position and related data in relation to map outline data for the airport movement area at designated aerodromes.

The NAS shall distinguish classes of aircraft on aerodrome surface when they are separated by 40 feet in range, or 80 feet in azimuth at a range of up to 12,000 feet.

#### 3.2.4.2.5 Separate aircraft from surface obstacles

The NAS shall separate aircraft from other aircraft on the movement areas of designated aerodromes in all weather conditions.

The NAS shall separate aircraft from vehicles on the movement areas of designated aerodromes in all weather conditions.

The NAS shall separate aircraft from obstacles on the movement areas of designated aerodromes in all weather conditions.

### 3.3 ATC-Advisories

#### 3.3.1 Weather Advisories

##### 3.3.1.1 Provide Weather Information

The NAS shall provide weather information.

The NAS shall provide forecast weather information in a compatible form to the systems performing the projection function.

The NAS shall provide current weather information in a compatible form to the systems performing the projection function.

The NAS shall provide forecast weather for trajectory development within 30 seconds of weather-product delivery to the NAS.

The NAS shall have the capability for the specialist to independently select at least 6 levels of precipitation.

The NAS shall provide flexible and convenient access to required weather information to users.

##### 3.3.1.1.1 Acquire Weather Information



#### 3.3.1.1.1.1 Detect Weather

The NAS shall detect non-convective turbulence.

##### 3.3.1.1.1.1.1 Detect the presence of wind shear

The NAS shall detect the presence of wind shear within terminal areas.

The NAS shall acquire surface wind speed within terminal areas.

The NAS shall acquire surface wind direction within terminal areas.

The NAS shall acquire wind gust information within terminal areas.

The NAS shall update surface wind speed within terminal areas.

The NAS shall update surface wind direction within terminal areas.

The NAS shall update wind gust information within terminal areas.

The NAS shall store surface wind speed within terminal areas.

The NAS shall store surface wind direction within terminal areas.

The NAS shall store wind gust information within terminal areas.

The NAS shall retrieve surface wind speed within terminal areas.

The NAS shall retrieve surface wind direction within terminal areas.

The NAS shall retrieve wind gust information within terminal areas.

The NAS shall disseminate surface wind speed within terminal areas.

The NAS shall disseminate surface wind direction within terminal areas.

The NAS shall disseminate wind gust information within terminal areas.

The NAS shall display surface wind speed within terminal areas.

The NAS shall display surface wind direction within terminal areas.

##### 3.3.1.1.1.1.2 Identify weather hazardous to aviation

The NAS shall identify those weather conditions that are potentially hazardous to aviation.

##### 3.3.1.1.1.2 General Weather

###### 3.3.1.1.1.2.1 Acquiring and maintaining weather information

The NAS shall acquire weather information covering the airspace delegated to the United States for the provision of Air Traffic Control (ATC) (US delegated airspace).

The NAS shall store weather information covering US delegated airspace.

The NAS shall archive weather information covering US delegated airspace.

The NAS shall update weather information covering US delegated airspace.

The NAS shall retrieve weather information covering US delegated airspace.

###### 3.3.1.1.1.2.2 Acquire weather for the entire NAS airspace

The NAS shall acquire information on the presence of hazardous weather in a defined airspace.

The NAS shall acquire hazardous weather information for the terminal area.

The NAS shall acquire current weather data for the airspace delegated to the NAS geographic and oceanic area.

The NAS shall store current weather data for the airspace delegated to the NAS geographic and oceanic area.

The NAS shall disseminate current weather data for the airspace delegated to the NAS geographic and oceanic area.

The NAS shall acquire forecast weather data for the airspace delegated to the NAS geographic and oceanic area.

The NAS shall store forecast weather data for the airspace delegated to the NAS geographic and oceanic area.

The NAS shall disseminate forecast weather data for the airspace delegated to the NAS geographic and oceanic area.

#### 3.3.1.1.1.2.3 Acquire graphical weather information

The NAS shall acquire graphical weather information.

The NAS shall disseminate graphical weather information to ground users.

The NAS shall disseminate graphical weather information to airborne users.

The NAS shall store graphical weather information.

The NAS shall update graphical weather information.

The NAS shall retrieve graphical weather information.

The NAS shall disseminate graphical weather information to specialists.

The NAS shall disseminate graphical weather information to meteorologists.

The NAS shall acquire time-sequenced animated graphical weather information.

The NAS shall store time-sequenced animated graphical weather information.

The NAS shall update time-sequenced animated graphical weather information.

The NAS shall retrieve time-sequenced animated graphical weather information.

The NAS shall present time-sequenced animated graphical weather information to specialists.

The NAS shall present time-sequenced animated graphical weather information to meteorologists.

The NAS shall overlay graphical weather products for analysis by specialists.

The NAS shall retrieve specialist annotations to graphical weather products.

The NAS shall display specialist annotations to graphical weather products.

The NAS shall overlay graphical weather products for analysis by meteorologists.

The NAS shall acquire specialist annotations to graphical weather products.

The NAS shall store specialist annotations to graphical weather products.

The NAS shall update specialist annotations to graphical weather products.

#### 3.3.1.1.1.2.4 Acquire trend weather information

The NAS shall determine trend surface observation weather information for the past 3 hours.

The NAS shall store trend weather information for weather conditions aloft for the past 3 hours.

The NAS shall update trend weather information for weather conditions aloft for the past 3 hours.

The NAS shall retrieve trend weather information for weather conditions aloft for the past 3 hours.

#### 3.3.1.1.1.3 International Weather

##### 3.3.1.1.1.3.1 Acquire international weather for flow control use

The NAS shall acquire forecast international weather data for flow control use.

The NAS shall store forecast international weather data for flow control use.

The NAS shall disseminate forecast international weather data to local traffic management coordinators.

##### 3.3.1.1.1.3.2 Acquire foreign terminal forecasts at major international aerodromes

The NAS shall acquire general foreign forecast weather data.

The NAS shall acquire general foreign current weather data.

The NAS shall store general foreign forecast weather data.

The NAS shall store general foreign current weather data.

The NAS shall disseminate general foreign forecast weather data.

The NAS shall disseminate general foreign current weather data.

##### 3.3.1.1.1.3.3 Acquire Weather information bordering US airspace

The NAS shall acquire weather information for areas bordering delegated U.S. airspace.

The NAS shall store weather information for areas bordering delegated U.S. airspace.

The NAS shall update weather information for areas bordering delegated U.S. airspace.

The NAS shall retrieve weather information for areas bordering delegated U.S. airspace.

The NAS shall acquire current weather information from designated public and private sources.

#### 3.3.1.1.1.4 Forecast Weather

##### 3.3.1.1.1.4.1 Acquire terminal forecast weather

The NAS shall acquire terminal aerodrome forecast (TAF) weather information for designated terminals.

The NAS shall store terminal aerodrome forecast weather information for designated terminals.

The NAS shall update terminal aerodrome forecast weather information for designated terminals.

The NAS shall update terminal weather forecasts at least once every 6 hours.

The NAS shall acquire Terminal Aerodrome Forecasts (TAFs) that cover a 24 hour forecast period.

##### 3.3.1.1.1.4.2 Acquire area forecast weather

The NAS shall acquire area forecast weather information.

The NAS shall update area forecasts at least once every 12 hours.

The NAS shall acquire area forecasts that cover a 24-hour area forecast period.

The NAS shall store area forecast weather information.

The NAS shall update area forecast weather information.

The NAS shall acquire winds aloft forecast weather information.

The NAS shall store winds aloft forecast weather information.

The NAS shall update winds aloft forecast weather information.

The NAS shall forecast non-convective turbulence for a 6-hour period.

#### 3.3.1.1.1.4.3 Acquire near term (4 to 12 hours) forecasts

The NAS shall acquire near term (4 to 12 hours) forecasts.

The NAS shall acquire near term (4 to 12 hours) forecasts specific to a designated volume of airspace.

The NAS shall store near term (4 to 12 hours) forecasts specific to a designated volume of airspace.

The NAS shall update near term (4 to 12 hours) forecasts specific to a designated volume of airspace.

The NAS shall retrieve near term (4 to 12 hours) forecasts specific to a designated volume of airspace.

The NAS shall disseminate near term (4 to 12 hours) forecasts specific to a designated volume of airspace.

The NAS shall display near term (4 to 12 hours) forecasts specific to a designated volume of airspace.

The NAS shall disseminate special 4 to 12 hour forecasts to local traffic management coordinators.

#### 3.3.1.1.1.4.4 Acquire forecast weather from public and private sources

The NAS shall acquire forecast weather information from designated public and private sources.

The NAS shall acquire weather conditions aloft for all U.S. delegated airspace.

The NAS shall acquire surface aviation weather observations, hourly.

The NAS shall store surface aviation weather observations.

The NAS shall update surface aviation weather observations upon receipt of new data.

The NAS shall retrieve surface aviation weather observations.

#### 3.3.1.1.1.5 Surface Weather

##### 3.3.1.1.1.5.1 Acquiring surface aviation weather

The NAS shall automatically acquire selected elements of surface aviation weather observation data at designated aerodromes.

The NAS shall automatically calculate elements of surface aviation weather observation data at designated aerodromes.

The NAS shall monitor surface weather conditions for designated aerodromes.

The NAS shall accept surface aviation weather observation data entered by qualified specialists at designated aerodromes.

The NAS shall disseminate surface aviation weather observation data.

The NAS shall display surface aviation weather observation data to specialists.

The NAS shall consider surface weather conditions in calculating runway capacity projection at designated aerodromes.

The NAS shall update automated weather observations once per hour.

The NAS shall update automated weather observations upon receipt of a significant change to the current observations.

The NAS shall disseminate automated weather observations once per minute to designated interfaces.

The NAS shall display automated weather observations.

#### 3.3.1.1.1.5.2 Acquire Special surface weather observations

The NAS shall acquire special surface weather observations (SPECIs).

The NAS shall display SPECIs.

The NAS shall disseminate SPECIs to designated interfaces.

The NAS shall update SPECIs.

The NAS shall store SPECIs.

#### 3.3.1.1.1.5.3 Acquire Runway visibility measurements

The NAS shall acquire runway visibility measurements for designated runways with precision approach procedures.

The NAS shall store runway visibility measurements for designated runways with precision approach procedures.

The NAS shall archive runway visibility measurements for designated runways with precision approach procedures.

The NAS shall update runway visibility measurements for designated runways with precision approach procedures.

The NAS shall retrieve runway visibility measurements for designated runways with precision approach procedures.

The NAS shall disseminate runway visibility measurements for designated runways with precision approach procedures.

The NAS shall display runway visibility measurements for designated runways with precision approach procedures.

#### 3.3.1.1.1.6 Weather Aloft

The NAS shall monitor winds aloft for designated aerodromes.

The NAS shall update ARTCC weather conditions aloft every 5 minutes.

The NAS shall update forecast models of weather conditions aloft.

The NAS shall provide accurate weather information such as temperatures aloft to support flight path prediction.

The NAS shall provide accurate weather information such as real-time winds and temperatures aloft to support flight path prediction.

#### 3.3.1.1.1.7 Predict Weather

##### 3.3.1.1.1.7.1 Predict storm cells for a forecast period of time

The NAS shall predict the development and movement of storm cells for a forecast period of 6 hours.

The NAS shall update storm cell predictions every 5 minutes.

The NAS shall acquire the location of storm cells.

The NAS shall store the location of storm cells.

The NAS shall update the location of storm cells.

The NAS shall archive the location of storm cells.

The NAS shall retrieve the location of storm cells.

##### 3.3.1.1.1.7.2 Predict movement of gust fronts

The NAS shall predict the movement of gust fronts for a forecast period of 6 hours.

The NAS shall update gust front predictions every 5 minutes.

The NAS shall acquire the location of gust fronts.

The NAS shall store the location of gust fronts.

The NAS shall update the location of gust fronts.

The NAS shall archive the location of gust fronts.

The NAS shall retrieve the location of gust fronts.

#### 3.3.1.1.1.8 Acquire intensity levels of weather

The NAS shall acquire intensity levels of weather.

The NAS shall store intensity levels of weather.

The NAS shall update intensity levels of weather.

The NAS shall retrieve intensity levels of weather.

The NAS shall disseminate intensity levels of weather by route of flight to specialists.

The NAS shall disseminate intensity levels of weather by route of flight to users.

The NAS shall display intensity levels of weather by route of flight to specialists.

The NAS shall display intensity levels of weather by route of flight to users.

The NAS shall disseminate intensity levels of weather by geographic area to specialists.

The NAS shall disseminate intensity levels of weather by geographic area to users.

The NAS shall display intensity levels of weather by geographic area to users.

The NAS shall display intensity levels of weather by geographic area to specialists.

#### 3.3.1.1.1.9 Acquire Pilot Reports

The NAS shall acquire pilot reports (PIREP).

The NAS shall store pilot reports (PIREP).

The NAS shall update pilot reports (PIREP).

The NAS shall acquire pilot reports (PIREP) from pilots on the ground.

The NAS shall acquire pilot reports (PIREP) from airborne pilots.

The NAS shall acquire pilot reports (PIREP) from airline dispatch offices.

The NAS shall retrieve pilot reports (PIREP) by planned routes of flight.

The NAS shall retrieve pilot reports (PIREP) by planned altitudes of flight.

The NAS shall retrieve pilot reports (PIREP) by local area.

#### 3.3.1.1.1.10 Acquire Unscheduled Short-Term Advisory Weather Information

The NAS shall acquire unscheduled short-term advisory weather information.

The NAS shall store unscheduled short-term advisory weather information.

The NAS shall update unscheduled short-term advisory weather information.

The NAS shall acquire unscheduled short-term forecast weather information.

The NAS shall store unscheduled short-term forecast weather information.

The NAS shall update unscheduled short-term forecast weather information.

The NAS shall acquire short-term (up to 2 hours) forecasts specific to a designated volume of airspace.

The NAS shall store short-term (up to 2 hours) forecasts specific to a designated volume of airspace.

The NAS shall update short-term (up to 2 hours) forecasts specific to a designated volume of airspace.

The NAS shall archive short-term (up to 2 hours) forecasts specific to a designated volume of airspace.

The NAS shall retrieve short-term (up to 2 hours) forecasts specific to a designated volume of airspace.

The NAS shall disseminate short-term (up to 2 hours) forecasts specific to a designated volume of airspace.

The NAS shall display short-term (up to 2 hours) forecasts specific to a designated volume of airspace.

The NAS shall disseminate wind information using a pre-defined format.

The NAS shall disseminate temperature information using a pre-defined format.

The NAS shall disseminate precipitation weather information using a pre-defined format.

The NAS shall disseminate cloud cover information in accordance with FAA Order 7900.5 or FMH-1.

The NAS shall disseminate weather information for a geographical area specified.

The NAS shall disseminate horizontal depictions of weather conditions.

The NAS shall disseminate vertical depictions of weather conditions.

The NAS shall acquire current domestic weather data for flow control use.

The NAS shall store current domestic weather data for flow control use.

The NAS shall disseminate current domestic weather data to local traffic management coordinators.

The NAS shall disseminate current domestic weather data to traffic management specialists.

The NAS shall acquire forecast domestic weather data for flow control use.

The NAS shall store forecast domestic weather data to local traffic management coordinators.

The NAS shall disseminate forecast domestic weather data to traffic management specialists.

The NAS shall disseminate forecast domestic weather data for flow control use.

The NAS shall disseminate 24-hour weather forecasts.

The NAS shall broadcast the current information on hazardous weather conditions via communications media in use by NAS facilities and aircraft in flight.

The NAS shall disseminate selected weather information directly to appropriately equipped aircraft.

The NAS shall accept requests for weather information from airborne aircraft via voice.

The NAS shall accept requests for weather information from airborne aircraft via data link communications.

The NAS shall acquire weather data for the NAS geographic area.

The NAS shall acquire weather data for the entire NAS oceanic area.

The NAS shall acquire weather data for the selected major international aerodromes



The NAS shall distribute graphical 24 hours forecast data to the local Traffic Management Coordinators.

The NAS shall distribute graphical 24 hours Terminal forecast data to the local Traffic Management Coordinators.

The NAS shall distribute forecast updates every four hours to the local the Traffic Management Coordinators.

The NAS shall acquire satellite-generated environmental data

The NAS shall store satellite-generated environmental data.

The NAS shall distribute satellite-generated environmental data to the ATCSCC no less than every 30 minutes.

The NAS shall acquire national weather radar mosaic data.

The NAS shall store national weather radar mosaic data.

The NAS shall distribute national weather radar mosaic data to the ATCSCC every 10 minutes or upon request.

The NAS shall distribute ARTCC related weather products to the ATCSCC specialist.

The NAS shall archive surface aviation weather observations.

#### 3.3.1.1.2 Disseminate Weather Information

##### 3.3.1.1.2.1 Disseminate international weather data

The NAS shall disseminate forecast international weather data to traffic management specialists.

The NAS shall acquire current weather data at major international aerodromes.

The NAS shall store current weather data at major international aerodromes.

The NAS shall disseminate current weather data at major international aerodromes.

The NAS shall acquire forecast weather data for major international aerodromes.

The NAS shall store forecast weather data for major international aerodromes.

The NAS shall disseminate forecast weather data for major international aerodromes.

##### 3.3.1.1.2.2 Disseminate requested weather information to specialists

The NAS shall disseminate requested current weather information to specialists within a means response time of 3.0 seconds of the request.

The NAS shall disseminate requested current weather data to specialists within a 99th percentile response time of 5.0 seconds of the request.

The NAS shall disseminate requested current weather data to specialists within a maximum response time of 10.0 seconds of the request.

The NAS shall disseminate requested forecast weather data to specialists within a means response time of 3.0 seconds of the request.

The NAS shall disseminate requested forecast weather data to specialists within a 99th percentile response time of 5.0 seconds of the request.

The NAS shall disseminate requested forecast weather data to specialists within a maximum response time of 10.0 seconds of the request.

##### 3.3.1.1.2.3 Disseminate updated aerodrome and terminal weather information using media accessible to aircraft in flight

The NAS shall broadcast the latest approved aerodrome conditions on communications media accessible by aircraft in flight.

The NAS shall broadcast the latest approved aerodrome conditions on communications media accessible by aircraft on the ground.

The NAS shall broadcast the latest approved terminal area conditions on communications media accessible by aircraft in flight.

The NAS shall broadcast the latest approved terminal area conditions on communications media accessible by aircraft on the ground.

The NAS shall respond to user requests for weather information from NAS facilities through common carrier communications networks.

The NAS shall respond to specialist requests for weather information from NAS facilities through common carrier communications networks.

#### 3.3.1.1.2.4 Disseminate weather directly to pilots

The NAS shall disseminate weather advisories via direct specialist to pilot communications.

The NAS shall disseminate weather advisories to users in response to a request.

The NAS shall disseminate weather advisory information at designated general aviation aerodromes with instrument approach procedures and terminal areas 7 days per week.

The NAS shall disseminate weather advisory information at designated general aviation aerodromes with instrument approach procedures and terminal areas continuously.

#### 3.3.1.1.2.5 Weather Dissemination Methods

The NAS shall disseminate weather information to users via voice.

The NAS shall disseminate weather information to users via telephone.

The NAS shall disseminate weather information to users via UHF radio.

The NAS shall disseminate weather information to users via VHF radio.

The NAS shall disseminate weather information via commercially available voice communication interfaces.

The NAS shall disseminate weather information via commercially available data communication interfaces.

The NAS shall establish standards for interactive on-line support to users requesting weather data.

#### 3.3.1.1.2.6 Hazardous Weather

##### 3.3.1.1.2.6.1 Disseminate hazardous weather information

###### 3.3.1.1.2.6.1.1 Disseminate Hazardous Weather

The NAS shall disseminate hazardous weather information before routine weather information.

The NAS shall disseminate hazardous weather information in graphical format represented to at least 3 levels of intensity.

The NAS shall disseminate hazardous weather information for airspace within 100 nmi of designated airspace.

The NAS shall broadcast hazardous weather notices until hazardous weather has dissipated.

The NAS shall disseminate hazardous weather information in textual format.

The NAS shall disseminate an aural alert upon receipt of significant change to the content of the Hazardous Weather message.

###### 3.3.1.1.2.6.1.2 Requests for Hazardous Weather

The NAS shall disseminate a requested summary of hazardous weather for any airspace in the continental United States within a mean response time 3.0 seconds of the request.

The NAS shall disseminate a requested summary of hazardous weather for any airspace in the continental United States within a maximum response time of 10.0 seconds of the request.

The NAS shall disseminate information on the presence of hazardous weather by route of flight upon request.

The NAS shall disseminate information on the presence of hazardous weather by altitude upon request.

The NAS shall disseminate information on the presence of hazardous weather by airspace upon request.

#### 3.3.1.1.2.6.1.3 Disseminate thunderstorm information

The NAS shall disseminate the location and intensity of thunderstorms.

The NAS shall acquire the location and intensity of thunderstorms.

The NAS shall store the location and intensity of thunderstorms.

The NAS shall update the location and intensity of thunderstorms.

The NAS shall archive the location and intensity of thunderstorms.

The NAS shall retrieve the location and intensity of thunderstorms.

The NAS shall predict the location and intensity of thunderstorms for a forecast period of 6 hours.

The NAS shall disseminate the location and intensity of thunderstorms forecasts.

The NAS shall display the location and intensity of thunderstorms.

The NAS shall display the location and intensity of thunderstorm forecasts.

The NAS shall store the location and intensity of thunderstorms forecasts.

The NAS shall update the location and intensity of thunderstorms forecasts.

The NAS shall retrieve the location and intensity of thunderstorms forecasts.

#### 3.3.1.1.2.6.1.4 Hazardous Weather to Specialists

The NAS shall disseminate Terminal area hazardous weather information to specialists within 1 minute of detection.

The NAS shall disseminate requested hazardous weather information to specialists within 100 nmi of his/her service area within a 99th percentile response time of 3.0 second of the request.

The NAS shall disseminate requested hazardous weather information to specialists within 100 nmi of his/her service area within a maximum response time of 6.0 seconds.

The NAS shall disseminate a requested summary of hazardous weather for any airspace in the continental United States within a 99th percentile response time of 5.0 seconds of the request.

The NAS shall disseminate requested hazardous weather information to specialists within 100 nmi of his/her service area within a mean response time of 1.5 seconds of the request.

The NAS shall notify specialists affected by the presence of hazardous weather within 2 minutes of acquisition.

#### 3.3.1.1.2.6.1.5 Hazardous Weather to Users

The NAS shall notify users affected by the presence of hazardous weather within 2 minutes of acquisition.

The NAS shall disseminate hazardous weather information with sufficient accuracy and emphasis in sufficient time to assist the user in avoiding the hazard.

The NAS shall disseminate hazardous weather information to airborne users for the volume of airspace within 100 nmi horizontal distance from the aircraft's current position.

The NAS shall disseminate hazardous weather information to the user with sufficient accuracy and emphasis in sufficient time before the aircraft is affected by the hazard.

The NAS shall disseminate Terminal area hazardous weather information to users within one minute of detection.

The NAS shall disseminate hazardous weather information to airborne users for the volume of airspace extending from the surface to an altitude of 60,000 feet MSL.

#### 3.3.1.1.2.6.1.5.1 Alert Specialists and Users of hazardous weather

The NAS shall alert users to the presence of hazardous weather.

The NAS shall alert the specialist upon receipt of hazardous weather information.

The NAS shall alert specialists to the presence of hazardous weather.

#### 3.3.1.1.2.6.2 Update Hazardous Weather Information

The NAS shall update hazardous weather information within 2 minutes.

The NAS shall update hazardous weather broadcasts within 5 minutes of a significant change.

The NAS shall update national hazardous weather information within 30 minutes.

The NAS shall update hazardous weather information until the hazard has dissipated.

The NAS shall update Terminal area hazardous weather information within one minute of receiving an update.

The NAS shall update Terminal area hazardous weather information until the hazard has dissipated.

The NAS shall update hazardous weather broadcasts at least once every 30 minutes.

#### 3.3.1.1.2.6.3 Assist users in avoiding hazardous weather

The NAS shall determine recommended aircraft actions to avoid hazardous weather.

The NAS shall assist users in avoiding hazardous weather conditions.

The NAS shall consider the hazardous weather intensity when recommending avoidance actions.

The NAS shall consider extent of hazardous weather when recommending avoidance actions.

The NAS shall consider hazardous weather direction of movement when recommending avoidance actions.

The NAS shall consider aircraft type when recommending hazardous weather avoidance actions.

The NAS shall consider amount of fuel remaining when recommending hazardous weather avoidance actions.

The NAS shall consider alternate aerodromes when recommending hazardous weather avoidance actions.

The NAS shall consider alternate routes when recommending hazardous weather avoidance actions.

The NAS shall consider air traffic when recommending hazardous weather avoidance actions.

#### 3.3.1.1.2.6.3.1 Weather Avoidance Recommendations

The NAS shall disseminate hazardous weather avoidance recommendations to specialists within 1 minute of request.

The NAS shall disseminate hazardous weather avoidance recommendations to users within 1 minute of request.

The NAS shall communicate aircraft actions to specialists within 1 minutes of implementing a weather avoidance plan.

The NAS shall communicate aircraft actions to users within 1 minutes of implementing a weather avoidance plan.

The NAS shall disseminate recommendations for hazardous weather avoidance via data-link.

The NAS shall disseminate recommendations for hazardous weather avoidance via voice communications.

The NAS shall disseminate recommended aircraft actions to avoid hazardous weather.

#### 3.3.1.1.2.7 User and Specialist Requests

##### 3.3.1.1.2.7.1 Support specialists requesting weather data

The NAS shall maintain interactive on-line support to specialists requesting weather data.

The NAS shall disseminate weather information for altitudes of interest by users.

The NAS shall disseminate weather information for altitudes of interest by specialists.

The NAS shall disseminate weather information by reporting station.

The NAS shall disseminate weather information by weather type as specified by users.

The NAS shall disseminate weather information by weather type as specified by specialists.

#### 3.3.1.1.2.7.2 Retrieve weather information based on user or specialist parameters

The NAS shall retrieve weather information based on user or specialist-defined parameters.

The NAS shall retrieve weather information by route of flight.

The NAS shall retrieve weather information by area.

The NAS shall retrieve weather information by location.

The NAS shall retrieve weather information by phase of flight.

The NAS shall retrieve weather information by phase of flight.

The NAS shall retrieve weather information by departure route.

The NAS shall retrieve weather information by destination.

The NAS shall retrieve weather information by en-route phase of flight.

The NAS shall retrieve weather information by weather type.

The NAS shall retrieve weather information by altitude of flight.

The NAS shall retrieve weather information by duration of flight.

The NAS shall retrieve weather information by time of flight.

The NAS shall retrieve weather information by content of weather information.

#### 3.3.1.1.3 Display Weather Information

##### 3.3.1.1.3.1 Display weather information to specialists

The NAS shall display Terminal area hazardous weather information to the specialist within 1 minute of detection.

The NAS shall display graphic weather data to the specialists with at least 6 levels of precipitation intensity.

The NAS shall display requested routine strategic weather information to the specialists within a mean response time of 3.0 seconds of the request.

The NAS shall display requested routine strategic weather information to the specialists within a 99th percentile response time of 5.0 seconds of the request.

The NAS shall display requested routine strategic weather information to the specialists within a maximum response time of 10.0 seconds of the request.

The NAS shall display requested routine weather information to the user within a mean response time of 3.0 seconds of the request.

The NAS shall display requested routine weather information to the user within a 99th percentile response time of 5.0 seconds of the request.

The NAS shall display requested routine weather information to the user within a maximum response time of 10.0 seconds of the request.

The NAS shall display requested routine weather information to the specialists within a mean response time of 3.0 seconds from the time of

the request.

The NAS shall display requested routine weather information to specialists within a 99th percentile response time of 5.0 seconds from the time of the request.

The NAS shall display requested routine weather information to specialists within a maximum response time of 10.0 seconds from the time of the request.

The NAS shall categorize observed weather conditions into distinguishable levels of intensity.

The NAS shall store information in weather phenomena that pose a hazard to VFR aircraft to TBD reliability.

The NAS shall store current domestic weather data for flow control use.

The NAS shall disseminate weather information to airborne users for pictorial display.

#### 3.3.1.1.3.2 Display gridded forecasts

The NAS shall display hourly gridded forecasts.

The NAS shall update hourly gridded forecasts covering CONUS from the surface up to 100 millibars level at least once every hour.

The NAS shall acquire hourly gridded forecasts covering a forecast period of twelve hours.

The NAS shall update 6-hour gridded forecasts at least once every 6 hours.

The NAS shall acquire 6-hour gridded forecasts covering all 8 octants of the globe.

The NAS shall acquire 6-hour gridded forecasts covering a forecast period of 72 hours.

The NAS shall display 6 -hour gridded forecasts.

#### 3.3.1.1.3.3 Display wind information

The NAS shall accurately display wind information.

The NAS shall acquire real-time wind information for the air traffic control tower operational area.

The NAS shall display real-time wind information for the air traffic control tower operational area.

The NAS shall acquire wind speed for designated points on the aerodrome surface.

The NAS shall acquire wind direction for designated points on the aerodrome surface.

The NAS shall store wind speed for designated points on the aerodrome surface.

The NAS shall store wind direction for designated points on the aerodrome surface.

The NAS shall detect variations in wind speed for designated points on the aerodrome surface.

The NAS shall detect variations in wind direction for designated points on the aerodrome surface.

The NAS shall display wind speed for designated points on the aerodrome surface.

The NAS shall display wind direction for designated points on the aerodrome surface.

#### 3.3.1.1.3.4 Display Hazardous Weather upon request

The NAS shall display requested hazardous weather information to specialists within a mean response time of 3.0 seconds of the request.

The NAS shall display requested hazardous weather information to specialists within a 99th percentile time of 5.0 seconds from the time of the request.

The NAS shall display requested hazardous weather information to the specialists within a maximum response time of 10.0 seconds from the time of the request.

#### 3.3.1.1.4 Provide Weather Products

##### 3.3.1.1.4.1 Provide weather information that is hazardous to VFR flights

The NAS shall detect weather phenomena that pose a hazard to VFR aircraft.

The NAS shall determine the location of weather phenomena that pose a hazard to VFR aircraft.

The NAS shall store information on weather phenomena that pose a hazard to VFR aircraft.

The NAS shall monitor weather phenomena that pose a hazard to VFR aircraft.

The NAS shall access information on weather phenomena that pose a hazard to VFR aircraft.

The NAS shall disseminate information on weather phenomena that pose a hazard to VFR aircraft.

The NAS shall update the position and intensity of weather phenomena that may affect VFR flight operations.

The NAS shall update the position and intensity of weather phenomena that may affect VFR flight operations.

The NAS shall disseminate the position and intensity of weather phenomena that may affect VFR flight operations.

The NAS shall disseminate the position and intensity of weather phenomena that may affect VFR flight operations.

##### 3.3.1.1.4.2 Provide weather information for areas bordering designated U.S. airspace

The NAS shall acquire current weather data for areas bordering designated U.S. Airspace.

The NAS shall store current weather data for areas bordering designated U.S. Airspace.

The NAS shall disseminate current weather data for areas bordering designated U.S. Airspace.

The NAS shall acquire forecast weather data for areas bordering designated U.S. Airspace.

The NAS shall store forecast weather data for areas bordering designated U.S. Airspace.

The NAS shall disseminate forecast weather data for areas bordering designated U.S. Airspace.

##### 3.3.1.1.4.3 Provide weather information for flow control use

The NAS shall acquire current international weather data for flow control use.

The NAS shall store current international weather data for flow control use.

The NAS shall disseminate current international weather data for flow control use.

##### 3.3.1.1.4.4 Provide continuous weather information service

The NAS shall acquire weather information to meet required response times during periods of peak demand.

The NAS shall store weather information to meet required response times during periods of peak demand.

The NAS shall update weather information to meet required response times during periods of peak demand.

The NAS shall retrieve weather information to meet required response times during periods of peak demand.

The NAS shall disseminate weather information sufficient to meet required response times during periods of peak demand.

##### 3.3.1.1.4.5 Provide weather information service with sufficient communication capacity

The NAS shall maintain communication links adequate to avoid user delay in gaining access.

The NAS shall disseminate weather information to users continuously.

The NAS shall disseminate current weather effect along the users proposed flight path.



The NAS shall disseminate forecast weather in effect along the users proposed flight path.

#### 3.3.1.1.4.6 Provide 24-hour weather forecasts

The NAS shall acquire 24-hour weather forecasts

The NAS shall disseminate requested forecast weather data within a mean time of 3 seconds of ATCSCC specialists' request.

The NAS shall disseminate requested forecast weather data within a 99th percentile time of 5.0 seconds of ATCSCC specialists' request.

The NAS shall disseminate requested forecast weather data within a maximum of 10 seconds of ATCSCC specialists' request.

The NAS shall disseminate forecast weather data within a mean time of 3 seconds of local traffic management coordinator request.

The NAS shall disseminate forecast weather data within a 99th percentile time of 5.0 seconds of local traffic management coordinator request.

The NAS shall disseminate forecast weather data within a maximum of 10 seconds of local traffic management coordinator request.

#### 3.3.1.1.4.7 Provide weather information to specialists at the ATCSCC

The NAS shall disseminate weather information to specialists at the ATCSCC.

The NAS shall disseminate Textual weather information for foreign weather to specialists at the ATCSCC.

The NAS shall disseminate Textual weather information for NAS terminal weather to specialists at the ATCSCC.

The NAS shall disseminate Forecast information in graphic form for up to 24 hours in advance to specialists at the ATCSCC.

The NAS shall disseminate graphical presentations of the weather anywhere in the NAS coverage to specialists at the ATCSCC.

The NAS shall disseminate Textual forecast information for foreign weather to specialists at the ATCSCC.

The NAS shall disseminate Textual forecast information for NAS terminal weather to specialists at the ATCSCC.

#### 3.3.1.1.4.8 Store Weather

##### 3.3.1.1.4.8.1 Store Weather Aloft

The NAS shall store weather conditions aloft.

The NAS shall archive weather conditions aloft.

The NAS shall store weather conditions aloft (except thunderstorm data) on 50nmi by 50nmi grids.

The NAS shall store weather conditions aloft from 6000 ft AGL to 60,000 ft MSL in U.S. designated airspace.

The NAS shall store weather conditions aloft from ground to 10,000 ft AGL within 45nmi of qualifying aerodromes.

##### 3.3.1.1.4.8.2 Store Hazardous Weather

The NAS shall store terminal area hazardous weather information.

The NAS shall archive terminal area hazardous weather information.

The NAS shall store thunderstorm data on a 10nmi by 10nmi or smaller grid.

The NAS shall store thunderstorm data in a minimum of three altitude bands.

##### 3.3.1.1.4.8.2.1 Retrieve Hazardous Weather Information

The NAS shall retrieve hazardous weather information for airspace within 100 nmi of designated airspace.

The NAS shall retrieve hazardous weather information in graphical format represented to at least 3 levels of intensity.

The NAS shall retrieve hazardous weather information in textual format.

The NAS shall retrieve information on the presence of hazardous weather by airspace affected.

The NAS shall retrieve information on the presence of hazardous weather by altitude.

The NAS shall retrieve information on the presence of hazardous weather by route of flight.

#### 3.3.1.1.5 Other Weather Requirements

The content of weather aloft information shall include at least the following: (1) Wind speed and direction aloft (2) Temperature aloft (3) Tops and bottoms of cloud layers (4) Clear air turbulence (5) Thunderstorms with associated turbulence and hail (6) Icing

The content of surface observations shall include at least the following elements: (1) Cloud layer height and amount (2) Visibility (3) Precipitation occurrence, type and amount (4) Temperature (5) Dew point (6) Wind speed, direction, and peak gusts (7) Altimeter setting and density altitude (8) Obstruction to visibility (9) Lightning or thunderstorms (10) Runway visual range (11) Snow depth and runway surface condition

Weather conditions can significantly affect aircraft operations, performance and safety. Planning of flights requires the availability of timely and accurate weather information such as: upper air winds, upper air temperatures, and hazardous weather data. A capability is required to select and access weather information which could affect flight planning. Weather information is required by specialists and users. The organization of the requirements for this section is illustrated in Figure 3-3.

Weather Data: requirements A, B, C, D, F and G of 3.1.1 also apply to this paragraph. (Section 3.1.1 identifies weather information requirements. It specifies the requirements for weather information acquisition and maintenance, coverage, accuracy, timeliness, and content. This section will generally not repeat these requirements but will reference 3.1.1 except where there are unique or additional weather information requirements not already covered in 3.1.1.)

Pictorial displays shall allow different elements of the display to be separately distinguishable (e.g., by utilizing levels of brightness or colors).

The NAS shall be capable of determining or measuring weather intensity with sufficient accuracy to assign the appropriate intensity level, while meeting the accuracy requirements of 3.1.1.A.2 above.

The weather avoidance function shall be available on a continuous basis.

The NAS shall be capable of providing weather advisories to aircraft in flight.

#### 3.3.2 Traffic Advisory

The NAS shall display position of VFR aircraft in the terminal departure and arrival phases of flight.

##### 3.3.2.1 Monitor and disseminate traffic advisories.

###### 3.3.2.1.1 Provide traffic advisories to airborne aircraft

The NAS shall provide traffic advisories to aircraft in the air.

The NAS shall monitor the progress of aircraft in selected low altitude environments receiving flight following services.

The NAS shall update the progress of aircraft in selected remote environments receiving flight following services.

Flight following service shall be available regardless of weather conditions.

The NAS shall provide traffic advisories to aircraft on the surface.

The NAS shall determine when a potential traffic conflict exists between a requesting VFR aircraft and other aircraft.

The NAS shall disseminate traffic advisories to pilots when applying VFR separation services.

The NAS shall disseminate traffic advisories upon user request.

##### 3.3.2.2 Provide safety advisories

The NAS shall provide safety advisories.

The NAS shall disseminate safety advisories to participating aircraft when situations occur involving proximity to other aircraft.

The NAS shall disseminate safety advisories to participating aircraft when situations occur involving proximity to terrain.

The NAS shall disseminate safety advisories to participating aircraft when situations occur involving proximity to obstructions.

The NAS shall disseminate safety advisories to participating aircraft when situations occur involving proximity to special use airspace.

The NAS shall disseminate the relative position of primary collision threat(s) to affected users.

#### 3.3.2.3 Issue advisories

The NAS shall disseminate advisories to aircraft approaching special use airspace.

The NAS shall update the boundaries of special use airspace.

The NAS shall provide traffic alerts to participating aircraft within 5 nmi, 500 feet below and 500 above special use airspace.

The NAS shall monitor non-participating aircraft within 5 nmi, 500 feet below and 500 above special use airspace.

The NAS shall notify specialist when known traffic approaches special use airspace.

The NAS shall monitor progress of aircraft operating within designated hazardous areas.

#### 3.3.3 NAS Status Advisory

The NAS shall disseminate NAS Status information to designated military officials.

The NAS shall disseminate future delay advisories in effect along the users proposed flight path.

The NAS shall disseminate airway usage information to users.

The NAS shall disseminate route usage information to specialists.

The NAS shall disseminate route usage information to users.

The NAS shall disseminate airway usage information to specialists.

The NAS shall discontinue the transmittal of a navigation aid's identification signal whenever the operation of the navigation aid has been discontinued.

The NAS shall discontinue the transmittal of a navigation aid's identification signal during maintenance.

The NAS shall discontinue the transmittal of a navigation aid's identification signal during testing.

#### 3.3.3.1 Provide aeronautical information

The NAS shall disseminate aeronautical information per user request.

The NAS shall retrieve aeronautical data by user requested flight path.

The NAS shall retrieve aeronautical information by user requested location.

The NAS shall retrieve aeronautical information by user requested area.

The NAS shall retrieve aeronautical information by user requested time.

The NAS shall acquire aeronautical information from any source concerned with operations of the NAS.

The NAS shall store aeronautical information for all phases of flight.

The NAS shall acquire aeronautical information for total geographic area of NAS responsibility.

The NAS shall acquire aeronautical information from any source concerned with components of the NAS.

The NAS shall verify aeronautical information from any source concerned with operations of the NAS.

The NAS shall verify aeronautical information from any source concerned with components of the NAS.

The NAS shall store verified aeronautical information from any source concerned with operations of the NAS.

The NAS shall store verified aeronautical information from any source concerned with components of the NAS.

The NAS shall segregate unverified aeronautical information from sources concerned with operations of the NAS.

The NAS shall segregate unverified aeronautical information from sources concerned with components of the NAS.

The NAS shall disseminate aeronautical information upon user request continuously.

The NAS shall disseminate aeronautical information to users via external data interfaces.

The NAS shall disseminate aeronautical information to users via air-ground data communications.

The NAS shall disseminate aeronautical data for a maximum of 8 specified locations per request.

The NAS shall disseminate requested aeronautical information to users within a maximum response time of 10.0 seconds of the request.

The NAS shall disseminate requested aeronautical information to users within a mean response time of 3.0 seconds of the request.

The NAS shall disseminate requested aeronautical information to users within a 99th percentile response time of 5.0 second of the request.

#### 3.3.3.2 Provide aeronautical information to specialists.

The NAS shall disseminate aeronautical information to specialists continuously.

The NAS shall disseminate requested aeronautical information to specialists within a mean response time of 3.0 seconds of the request.

The NAS shall disseminate requested aeronautical information to specialists within a 99th percentile response time of 5.0 second of the request.

The NAS shall disseminate requested aeronautical information to specialists within a maximum response time of 10.0 seconds of the request.

#### 3.3.3.3 Manage aeronautical information for U.S. delegated airspace

The NAS shall store aeronautical data for U.S. delegated airspace.

The NAS shall discard aeronautical information no longer valid within 1 hour.

The NAS shall discard aeronautical information no longer relevant within 1 hour.

The NAS shall retrieve aeronautical information within 1 minute of its storage in a NAS database.

The NAS shall retrieve aeronautical data along specified routes.

The NAS shall retrieve aeronautical data for specified locations.

The NAS shall retrieve aeronautical data for specified areas.

The NAS shall retrieve aeronautical data for reporting location.

The NAS shall retrieve aeronautical data along routes with a maximum of 40 route elements.

The NAS shall retrieve aeronautical data for a maximum of 8 selected reporting locations per request.

The NAS shall disseminate preferred route information at least 24 hours prior to it becoming effective.

The NAS shall disseminate current delay advisories in effect along the users proposed flight path.

The NAS shall monitor runway conditions for designated aerodromes.

#### 3.3.3.4 Provide status of special use airspace.

The NAS shall disseminate the status of special use airspace.

The NAS shall acquire data on the status of special use airspace.

The NAS shall disseminate special use airspace information at least 2 hours prior to it becoming effective.

The NAS shall disseminate the status of special use airspace to users.

The NAS shall disseminate the status of special use airspace to specialists.

The NAS shall disseminate current flight activity information in Restricted Areas.

The NAS shall disseminate current flight activity information in Warning Areas.

The NAS shall disseminate current flight activity information in Military Operating Areas.

The NAS shall disseminate current flight activity information in Controlled Firing Areas.

The NAS shall disseminate current flight activity information in Military Training Routes.

The NAS shall disseminate scheduled flight activity information in Restricted Areas.

The NAS shall disseminate scheduled flight activity information in Warning Areas.

The NAS shall disseminate scheduled flight activity information in Military Operating Areas.

The NAS shall disseminate scheduled flight activity information in Controlled Firing Areas.

The NAS shall disseminate scheduled flight activity information in Parachute Jump Areas.

The NAS shall disseminate scheduled flight activity information in Military Training Areas.

The NAS shall disseminate current flight activity information in military special use airspace within 1 minute of request.

The NAS shall disseminate scheduled flight activity information in military special use airspace within 1 minute of request.

The NAS shall disseminate status of military special use airspace via commercial telephone lines

The NAS shall store data on the status of special use airspace.

The NAS shall update the status of special use airspace.

The NAS shall notify users of the schedules for airspace usage.

The NAS shall notify specialists of the schedules for airspace usage.

#### 3.3.3.5 Provide navigation status

The NAS shall alert users when a change in status of a navigation system is detected.

The NAS shall inform specialists of the status of supplemental navigation systems.

The NAS shall inform users of the status of supplemental navigation systems.

The NAS shall alert specialists within 10 seconds, of failures to navigation guidance that affect operations.

The NAS shall alert users within 10 seconds, of failures to portions of navigation guidance that affect operations.

The NAS shall alert specialists within 10 seconds, of failures to portions of navigation guidance that affect operations.

### 3.4 TM-Synchronization

#### 3.4.1 Airborne Synchronization

The NAS shall receive specialists' inputs, display position data received from all sources, process this information, apply procedural standards, and issue sequencing and spacing advisories to specialists.

The NAS shall establish landing and departing sequencing at specified aerodromes.

#### 3.4.1.1 Analyze conditions

The NAS shall analyze conditions that affect traffic management synchronization.

##### 3.4.1.1.1 Acquire information on conditions

The NAS shall detect changes in conditions that affect traffic management synchronization.

The NAS shall detect current clearance-based trajectories that are in noncompliance with metering restrictions.

The NAS shall detect current clearance-based trajectories that are in noncompliance with preferential route restrictions.

The NAS shall detect change to flow restrictions.

The NAS shall detect change to airspace restrictions.

##### 3.4.1.1.2 Evaluate information

The NAS shall analyze information influencing current runway selections.

The NAS shall acquire traffic conditions to determine active runway selections.

The NAS shall acquire traffic conditions to determine active runway selections.

The NAS shall retrieve NAS weather data for traffic management synchronization use.

The NAS shall analyze sequencing and spacing advisories for aircraft-aircraft conflicts.

The NAS shall analyze available information influencing selection of active runways.

The NAS shall retrieve information influencing selection of active runways.

##### 3.4.1.2 Provide runway selections

The NAS shall provide runway selections.

##### 3.4.1.2.1 Future runway selection recommendations

The NAS shall provide future runway selection recommendations.

The NAS shall provide recommendations for future runway selection based on forecast weather.

The NAS shall provide recommendations for future runway selection based on forecast weather.

The NAS shall provide recommendations for future runway selection based on traffic conditions.

The NAS shall provide recommendations for future runway selection based on traffic conditions.

The NAS shall perform runway selection for future runway configuration every 2 hours.

##### 3.4.1.2.2 Current runway selection recommendations

The NAS shall provide current runway selection recommendations.

The NAS shall disseminate recommendations for current runway selection.

The NAS shall perform runway selection immediately upon a wind change of more than +2.5 knots in speed.

The NAS shall perform runway selection immediately upon a wind change of 45 degrees in direction.

The NAS shall provide recommended runway configurations for selected airports/groups of airports based on environmental data for selected look-ahead times from 0-24 hours in 15 minute intervals.

The NAS shall provide recommended runway configurations for selected airports/groups of airports based on demand data for selected look ahead times from 0-24 hours in 15-minute intervals.

#### 3.4.1.3 Evaluate possible metering solutions

The NAS shall evaluate alternate clearances for sequencing and spacing problems, within specified time limits.

The NAS shall estimate metering delay with an error of no more than 1-minute difference from the actual delay.

The NAS shall evaluate metering solutions to correctly synchronize traffic.

The NAS shall evaluate possible metering solutions to synchronize traffic.

The NAS shall evaluate alternate clearances for compliance with metering restrictions.

##### 3.4.1.3.1 Evaluate Spacing Solutions

The NAS shall evaluate spacing advisories for aircraft intrusion into special use airspace.

The NAS shall evaluate spacing advisories for aircraft-aircraft conflicts.

The NAS shall evaluate spacing advisories for clearance-based trajectories.

##### 3.4.1.3.2 Evaluate Sequencing Solutions

The NAS shall evaluate sequencing advisories for aircraft intrusion into special use airspace.

The NAS shall evaluate sequencing advisories for aircraft-aircraft conflicts.

The NAS shall evaluate sequencing advisories against clearance-based trajectories.

##### 3.4.1.3.3 Display Possible Metering Solutions

The NAS shall display resolutions identified in the alternate clearance given to resolve sequencing and spacing problems.

The NAS shall display problems identified in the alternate clearance given to resolve sequencing and spacing problems.

The NAS shall display surveillance information updates within 2 seconds of detection.

#### 3.4.1.4 Generate Synchronization Solutions

The NAS shall use separation standards in the generation of plans for sequencing and spacing of air traffic.

The NAS shall monitor all metering generated recommendations for flight plan based trajectories.

##### 3.4.1.4.1 Generate Sequencing Plans

The NAS shall generate plans for sequencing of air traffic.

The NAS shall determine alternate clearances to resolve sequencing problems.

The NAS shall analyze sequencing plans for clearance-based trajectories separation violations.

##### 3.4.1.4.2 Generate Spacing Plans

The NAS shall generate plans for spacing of air traffic.

The NAS shall generate traffic spacing advisories.

The NAS shall analyze spacing plans for clearance-based trajectories separation violations.



The NAS shall determine alternate clearances to resolve spacing problems.

#### 3.4.1.4.3 Generate Metering Solutions

The NAS shall generate metering solutions to address synchronization issues.

The NAS shall generate projections of predicted altitude profiles derived from aircraft specific data with an error of less than 1000 feet.

The NAS shall generate a speed advisory for metering that has less than 10 percent difference between the calculated delay absorbed and the actual delay absorbed.

The NAS shall generate a descent advisory for metering that has less than 10 percent difference between the calculated delay absorbed and the actual delay absorbed.

#### 3.4.1.4.4 Accept Specialists' Input

The NAS shall accept specialists' air traffic sequence inputs.

The NAS shall adjust specialists' air traffic sequence based on desired sequence and time.

#### 3.4.1.5 Implement Synchronization Solutions

The NAS shall generate synchronization solutions.

The NAS shall assign clearances based on current preferential route restrictions.

##### 3.4.1.5.1 Implement Sequencing and Spacing Plans

The NAS shall disseminate traffic spacing advisories to specialists.

The NAS shall disseminate alternate clearances to resolve spacing problems.

The NAS shall disseminate traffic sequencing advisories to specialists.

The NAS shall sequence VFR aircraft in the departure phase of flight.

The NAS shall sequence VFR aircraft in the terminal arrival phase of flight.

The NAS shall disseminate alternate clearances to resolve sequencing problems.

##### 3.4.1.5.1.1 Respond to specialists' Inputs

The NAS shall respond to specialists' spacing inputs for approach and departure within a 99th percentile response time of 1.2 seconds.

The NAS shall respond to specialists' spacing inputs for approach and departure within a maximum response time of 3.0 seconds.

The NAS shall respond to specialists' spacing inputs for approach and departure within a means response time of 0.6 seconds.

The NAS shall respond to specialists' sequencing inputs for approach and departure within a 99th percentile response time of 1.2 seconds.

The NAS shall respond to specialists' sequencing inputs for approach and departure within a maximum response time of 3.0 seconds.

The NAS shall respond to specialists' sequencing inputs for approach and departure within a means response time of 0.6 seconds.

##### 3.4.1.5.2 Implement Metering Solutions

The NAS shall meter traffic as required to achieve a balance between traffic demand and capacity of the NAS airspace and aerodrome resources.

The NAS shall notify specialists controlling the affected flights upon detection of flow restrictions changes.

The NAS shall notify specialists of changes to traffic flow restrictions.

The NAS shall notify specialists of changes to airspace restrictions.

##### 3.4.1.5.3 Noncompliance Issues

The NAS shall address noncompliance with metering solutions.

The NAS shall provide advisories to the specialist to resolve noncompliance of current clearance-based trajectories with preferential route restrictions.

The NAS shall provide advisories to the specialist to resolve noncompliance of current clearance-based trajectories with metering restrictions.

The NAS shall detect noncompliance with current clearance-based trajectories for metering restrictions.

### 3.4.2 Surface Synchronization

#### 3.4.2.1 Surface Synchronization Plans

The NAS shall establish surface synchronization plans to support the accepted traffic synchronization plan.

The NAS shall generate surface synchronization plans based on arrival and departure sequences.

The NAS shall review arrival and departure sequences and schedules.

#### 3.4.2.2 Provide Taxi Clearances

The NAS shall provide taxi clearances to aircraft.

The NAS shall disseminate taxi clearances to pilots.

The NAS shall generate taxi clearances that support the surface synchronization plan.

#### 3.4.2.3 Surface Movement Information

The NAS shall provide surface movement information to ground vehicles.

The NAS shall disseminate surface movement information to ground vehicles.

The NAS shall generate surface movement sequences that support the surface synchronization plan.

### 3.5 TM-Strategic Flow

Saturation of specific airspace or aerodromes may require that aircraft be delayed or diverted in order to maintain safety. Knowledge of actual or potential saturation during flight planning allows plans to be adjusted for maximum efficiency. Therefore, the flow control and delay advisory information that affects flight planning must be disseminated.

Maximum safety and efficiency in the use of airspace or aerodromes results from a flow of air traffic which matches airspace user demands with available capacity, reducing congestion and unnecessary delays, allowing delays to be taken on the ground whenever possible, and accommodating military operations and national defense requirements. Maintaining this type of traffic flow imposes a requirement for a traffic management function that collects data on current and predicted airspace capacity and demand and compares these to detect potential and actual airspace saturation.

#### 3.5.1 Long Term Planning

##### 3.5.1.1 Provide Future Flight Day Situation

###### 3.5.1.1.1 Determine Future Flight Day Situation

The NAS shall determine future flight day situations.

The NAS shall monitor future flight day information pertinent to demand projections.

The NAS shall use future flight day information pertinent to demand projections.

The NAS shall monitor future flight day information pertinent to capacity projections.

###### 3.5.1.1.2 Disseminate Future Flight Day Information

###### 3.5.1.1.2.1 Disseminate Capacity Projections

The NAS shall disseminate future flight day information pertinent to capacity projections to specialists.

The NAS shall disseminate future flight day IFR traffic capacity projections to local traffic management specialists for specified airway route segments.

The NAS shall disseminate future flight day IFR traffic capacity projections to local traffic management specialists for specified sectors.

The NAS shall disseminate future flight day IFR traffic capacity projections to ATCSCC specialists for specified aerodromes.

The NAS shall disseminate future flight day IFR traffic capacity projections to ATCSCC specialists for specified airway route segments.

The NAS shall disseminate future flight day IFR traffic capacity projections to ATCSCC specialists for specified sectors.

#### 3.5.1.1.2.2 Disseminate Demand Projections

The NAS shall disseminate future flight day information pertinent to demand projections to specialists.

The NAS shall disseminate future flight day IFR traffic demand projections to ATCSCC specialists for specified airway route segments.

The NAS shall disseminate future flight day IFR traffic demand projections to ATCSCC specialists for specified sectors.

#### 3.5.1.1.3 User Requests for Future Flight Day Information

##### 3.5.1.1.3.1 User Requests for Demand Projections

The NAS shall accept requests for future flight day demand projections.

The NAS shall accept future flight day demand projection requests from local traffic management coordinators.

The NAS shall disseminate results of future flight day demand projection requests to local traffic management coordinators in no more than 10 seconds of a request.

The NAS shall process future flight day demand projection requests from local traffic management coordinators.

The NAS shall accept future flight day demand projection requests from ATCSCC specialists.

The NAS shall disseminate results of future flight day demand projection requests to ATCSCC specialists in no more than 10 seconds of a request.

The NAS shall process future flight day demand projection requests from ATCSCC specialists.

##### 3.5.1.1.3.2 User Requests for Capacity Projections

The NAS shall accept requests for future flight day capacity projections.

The NAS shall accept future flight day capacity projection requests from local traffic management coordinators.

The NAS shall accept future flight day capacity projection requests from ATCSCC specialists.

The NAS shall process future flight day capacity projection requests from ATCSCC specialists.

The NAS shall process future flight day capacity projection requests from local traffic management coordinators.

The NAS shall disseminate future flight day IFR traffic capacity projections to local traffic management specialists for specified aerodromes.

The NAS shall disseminate results of future flight day capacity projection requests to local traffic management coordinators in no more than 10 seconds of a request.

The NAS shall disseminate results of future flight day capacity projection requests to ATCSCC specialists in no more than 10 seconds of a request

#### 3.5.1.2 Analyze Future Flight Day Situations

The NAS shall analyze future flight day situations.

The NAS shall input possible scenarios for future flight days.

The NAS shall analyze future flight day scenarios for imbalances in demand and capacity.

The NAS shall predict the impact of imbalances found in future flight day scenarios.

#### 3.5.1.3 Generate Future Flight Day Strategies

The NAS shall generate future flight day strategies.

The NAS shall acquire traffic conditions information to determine future traffic patterns and active runway selection.

The NAS shall analyze the impact of developed strategies for future flight days.

The NAS shall collaborate with users on the development of traffic flow management strategy alternatives.

The NAS shall use impact assessment of possible future traffic flow management scenarios to develop new traffic flow management strategy alternatives.

#### 3.5.2 Flight Day Management

##### 3.5.2.1 Provide Capacity Projections

The NAS shall provide capacity projections.

The NAS shall update capacity projections.

The NAS shall use information pertinent to current flight day capacity projections.

##### 3.5.2.1.1 Monitor Information Pertinent to Capacity

The NAS shall monitor information pertinent to capacity projections for the current flight day.

The NAS shall monitor local acceptance rate data for each runway at designated aerodromes.

The NAS shall detect flow restrictions changes.

The NAS shall detect airspace restrictions changes.

##### 3.5.2.1.1.1 Specialists' Inputs

The NAS shall accept specialists' inputs for aerodrome acceptance rates.

The NAS shall acquire specialists' inputs on aerodrome acceptance rates.

##### 3.5.2.1.2 Determine Current Capacity

The NAS shall determine current capacity conditions.

The NAS shall consider runway surface conditions in calculating runway capacity projections at designated aerodromes.

The NAS shall consider winds aloft in calculating runway capacity projections at designated aerodromes.

The NAS shall consider local acceptance rate data in calculating runway capacity projections at designated aerodromes.

The NAS shall consider terminal navigation equipment status in calculating runway capacity projections at designated aerodromes.

##### 3.5.2.1.2.1 Aerodrome Capacity

The NAS shall determine the number of IFR arrivals that can be supported by designated aerodromes.

The NAS shall determine the number of departures that can be handled on each runway for designated aerodromes.

The NAS shall determine the number of arrivals that can be handled on each runway for designated aerodromes.

The NAS shall determine the number of schedule departures that can be handled on each runway for designated aerodromes.

The NAS shall determine the number of scheduled arrivals that can be handled on each runway for designated aerodromes.

The NAS shall determine the number of IFR departures that can be supported by designated aerodromes.

#### 3.5.2.1.2.2 Airway Route Segments Capacity

The NAS shall determine the current demand on specified airway route segments.

The NAS shall determine the current capacity of specified airway route segments.

#### 3.5.2.1.2.3 Sector Capacity

The NAS shall determine the current demand on specified sectors.

The NAS shall determine the current capacity of specified sectors.

#### 3.5.2.1.3 Determine Future Capacity

The NAS shall predict future capacity conditions.

The NAS shall project the future capacity of specified airway route segments.

The NAS shall project the future capacity of specified sectors.

#### 3.5.2.1.4 Disseminate Capacity Information

The NAS shall disseminate capacity information to specialists.

The NAS shall update aerodrome capacity projections when information pertinent to capacity projections changes.

The NAS shall process requests for capacity information from specialists.

##### 3.5.2.1.4.1 Disseminate Capacity Information to Specialists

###### 3.5.2.1.4.1.1 Local Traffic Management Coordinators

###### 3.5.2.1.4.1.1.1 Airway Route Segment Capacity for Local Traffic Management Coordinators

The NAS shall disseminate airway route segment capacity projections to local traffic management coordinators for up to 2 hours from the current time.

The NAS shall disseminate IFR traffic capacity projections to local traffic management specialists for specified airway route segments.

The NAS shall disseminate 8-hour airway route segment capacity projections to local traffic management coordinators

###### 3.5.2.1.4.1.1.2 Sector Capacity for Local Traffic Management Coordinators

The NAS shall disseminate sector capacity projections to local traffic management coordinators for up to 2 hours from the current time

The NAS shall disseminate IFR traffic capacity projections to local traffic management specialists for specified sectors.

The NAS shall disseminate 8-hour sector capacity projections to local traffic management coordinators.

###### 3.5.2.1.4.1.1.3 Specified Aerodrome Capacity for Local Traffic Management Coordinators

The NAS shall disseminate IFR traffic capacity projections to local traffic management specialists for specified aerodromes

The NAS shall disseminate updated aerodrome capacity projections to local traffic management coordinators.

The NAS shall disseminate 2-hour aerodrome capacity projections to local traffic management coordinators.

###### 3.5.2.1.4.1.1.4 Local Traffic Management Coordinator Requests for Capacity Information

The NAS shall accept capacity projection requests from local traffic management coordinators.

The NAS shall process capacity projection requests from local traffic management coordinators.

The NAS shall disseminate the results of local traffic management coordinator capacity projection requests within a means response time of 3 seconds of the request.

The NAS shall disseminate the results of local traffic management coordinator capacity projection requests within 99th percentile response time of 5 seconds of the request.

The NAS shall disseminate the results of local traffic management coordinator capacity projection requests within a maximum response time of 10 seconds of the request.

#### 3.5.2.1.4.1.2 ATCSCC Specialists

##### 3.5.2.1.4.1.2.1 Airway Route Segment Capacity for ATCSCC Specialists

The NAS shall disseminate IFR traffic capacity projections to ATCSCC specialists for specified airway route segments.

The NAS shall disseminate 2-hour airway route segment capacity projections to ATCSCC specialists.

The NAS shall disseminate airway route segment capacity projections to ATCSCC specialists for up to 8 hours from the current time.

##### 3.5.2.1.4.1.2.2 Sector Capacity for ATCSCC Specialists

The NAS shall disseminate IFR traffic capacity projections to ATCSCC specialists for specified sectors.

The NAS shall disseminate 2-hour sector capacity projections to ATCSCC specialists.

The NAS shall disseminate sector capacity projections to ATCSCC specialists for up to 8 hours from the current time.

##### 3.5.2.1.4.1.2.3 Specified Aerodrome Capacity for ATCSCC Specialists

The NAS shall disseminate IFR traffic capacity projections to ATCSCC specialists for specified aerodromes.

The NAS shall disseminate updated aerodrome capacity projections to ATCSCC specialists.

The NAS shall disseminate 8-hour aerodrome capacity projections to ATCSCC specialists.

##### 3.5.2.1.4.1.2.4 ATCSCC Specialist Requests for Capacity Information

The NAS shall process capacity projection requests from ATCSCC specialists.

The NAS shall accept capacity projection requests from ATCSCC specialists.

The NAS shall disseminate the results of ATCSCC requested capacity projections within a means response time of 3 seconds of the request.

The NAS shall disseminate the results of ATCSCC requested capacity projections within the 99th percentile time of 5 seconds of the request.

The NAS shall disseminate the results of ATCSCC requested capacity projections within a maximum time of 10 seconds of the request.

#### 3.5.2.1.4.2 Capacity Projection Dissemination Parameters

The NAS shall disseminate aerodrome capacity projections by aircraft performance type.

The NAS shall disseminate aerodrome capacity projections by a specified time interval.

The NAS shall disseminate aerodrome capacity projections by number of aircraft per minute.

#### 3.5.2.2 Provide Demand Projections

The NAS shall update demand projections.

#### 3.5.2.2.1 Monitor Information Pertinent to Demand

The NAS shall monitor information pertinent to demand projections.

The NAS shall store Non-NAS weather data for flow control use.

The aircraft's reported altitude shall be provided to the local flow management coordinator.

The NAS shall acquire traffic count summary information for each sector in the NAS.

The NAS shall disseminate the projected location of each aircraft to ATCSCC specialists.

#### 3.5.2.2.2 Determine Demand

The NAS shall use information pertinent to demand projections.

The NAS shall generate demand projections for specialists.

The flight and flow management information shall pertain to the traffic management unit's assigned airspace structure boundary.

The NAS shall project the future demand on specified airway route segments.

The NAS shall project the future demand on specified sectors.

The NAS shall determine demand projections for designated aerodromes for a maximum of 8 hours in advance.

##### 3.5.2.2.2.1 Demand Projection Parameters

The NAS shall retrieve demand projections by destination airport.

The NAS shall retrieve demand projections by altitude.

The NAS shall retrieve demand projections by route of flight.

The NAS shall retrieve demand projections by geographic area.

The NAS shall retrieve demand projections by number of aircraft per time interval.

##### 3.5.2.2.3 Disseminate Demand Information

The NAS shall disseminate the number of planned IFR arrivals for designated runways.

The NAS shall disseminate the number of planned IFR departures for designated aerodromes.

The NAS shall disseminate the number of planned IFR arrivals for designated aerodromes.

The NAS shall disseminate the number of planned IFR departures for designated runways.

##### 3.5.2.2.3.1 Disseminate demand projections to specialists

The NAS shall disseminate demand projections to specialists.

###### 3.5.2.2.3.1.1 ATCSCC Specialists

The NAS shall disseminate 2-hour airway route segment demand projections to ATCSCC specialists.

The NAS shall disseminate 2-hour sector demand projections to ATCSCC specialists.

The NAS shall disseminate IFR traffic demand projections to ATCSCC specialists for specified airway route segments.

The NAS shall disseminate airway route segment demand projections to ATCSCC specialists for up to 8 hours from the current time.

The NAS shall disseminate sector demand projections to ATCSCC specialists for up to 8 hours from the current time.

The NAS shall distribute sector workload information for specified look-ahead times to the ATCSCC specialist



The NAS shall distribute traffic count summary information for each sector in the NAS to the ATCSCC specialist.

The NAS shall disseminate ATCSCC flow information summaries to the local traffic management Coordinators.

The NAS shall disseminate IFR traffic demand projections to ATCSCC specialists for specified sectors.

#### 3.5.2.2.3.1.2 ATCSCC Specialists Demand Requests

The NAS shall accept demand projection requests from ATCSCC specialists.

The NAS shall process demand projection requests from ATCSCC specialists.

The NAS shall disseminate the results of ATCSCC requested capacity projections within a means response time of 3 seconds of the request.

The NAS shall disseminate the results of ATCSCC requested capacity projections within the 99th percentile response time of 5 seconds of the request.

The NAS shall disseminate the results of ATCSCC requested capacity projections within a maximum response time of 10 seconds of the request.

#### 3.5.2.2.3.1.3 Local Traffic Management Specialists

The NAS shall disseminate airway route segment demand projections to local traffic management coordinators for up to 2 hours from the current time.

The NAS shall disseminate sector demand projections to local traffic management coordinators for up to 2 hours from the current time

The NAS shall disseminate 8-hour airway route segment demand projections to local traffic management coordinators

The NAS shall disseminate 8-hour sector demand projections to local traffic management coordinators.

The NAS shall distribute sector workload information for specified look-ahead times to the Local Traffic Management Coordinators.

The NAS shall distribute traffic count summary information for each sector in the NAS to the Traffic Management Coordinators.

The NAS shall disseminate flow management information to the local traffic management coordinators.

The NAS shall disseminate flight data information to local traffic management coordinators.

#### 3.5.2.2.3.1.4 Local Traffic Management Demand Requests

The NAS shall accept demand projection requests from local traffic management coordinators.

The NAS shall process demand projection requests from local traffic management coordinators.

The NAS shall disseminate the results of local traffic management coordinator demand projection requests within a means response time of 3 seconds of the request.

The NAS shall disseminate the results of local traffic management coordinator demand projection requests within a means response time of 5 seconds of the request.

The NAS shall disseminate the results of local traffic management coordinator demand projection requests within a maximum response time of 10 seconds of the request.

#### 3.5.2.3 Evaluate Capacity and Demand

The NAS shall evaluate capacity and demand.

The NAS shall be capable of exchanging airport utilization data and scheduled airline data, in both voice and data formats, with appropriately equipped airline dispatch offices.

The NAS shall analyze available airdrome capacity based on saturation information.

The NAS shall analyze airspace capacity based on saturation information.

#### 3.5.2.3.1 Analyze traffic saturation conditions.

The NAS shall predict airspace saturation no less than 8 hours in advance.

The NAS shall distribute traffic saturation summary information.

The NAS shall measure traffic saturation for selected aerodromes.

The NAS shall analyze potential traffic saturation for selected airdromes.

The NAS shall analyze potential traffic saturation for selected airspace.

The NAS shall analyze actual traffic saturation for selected airdromes.

The NAS shall analyze actual traffic saturation for selected airspace.

#### 3.5.2.4 Coordinate Traffic Flow Strategies

The NAS shall coordinate TM initiatives with specialists.

The NAS shall coordinate traffic flow strategies.

##### 3.5.2.4.1 Analyze Traffic Flow Alternatives

The NAS shall analyze alternate trial rerouting of proposed aircraft flight plans to resolve or minimize saturation conditions.

The NAS shall analyze operational alternatives based on saturation information.

The NAS shall analyze flight restrictions for specific aircraft based on saturation information.

The NAS shall analyze spacing advisories for clearance-based trajectories.

The NAS shall analyze spacing advisories for aircraft-aircraft conflicts.

The NAS shall analyze spacing advisories for aircraft intrusion into special use airspace.

##### 3.5.2.4.2 Coordinate Alternatives

The NAS shall allocate available aerodrome capacity.

The NAS shall allocate available airspace capacity.

The NAS shall process derived alternatives to the specialist.

The NAS shall process derived alternatives to the user.

The NAS shall generate local flow restrictions.

The NAS shall generate interfacility traffic flow plans.

The NAS shall disseminate interfacility traffic flow plans.

The NAS shall notify specialists controlling the affected flights upon detection of airspace changes.

##### 3.5.2.4.2.1 Exchange Traffic Flow Information

The NAS shall exchange traffic flow information between specialists.

The NAS shall exchange voice information between flight service specialists.

The NAS shall exchange data flow control information between flight service specialists.

The NAS shall exchange voice information between ATCSCC specialists.

The NAS shall exchange data flow control information between ATCSCC specialists.

The NAS shall exchange data flow control information between local traffic management coordinators and specialists.

The NAS shall disseminate voice information between local traffic management coordinators and specialists.

#### 3.5.2.4.2.1.1 Data Connectivity

The NAS shall have connectivity between the ATCSCC and the military scheduling facilities.

The NAS shall have data connectivity between all flight service stations and the ATCSCC.

The NAS shall have data connectivity between selected air traffic control facilities and the ATCSCC.

The NAS shall have data connectivity between the ATCSCC specialists and the local traffic management coordinators.

#### 3.5.2.4.2.1.2 Voice Connectivity

The NAS shall have voice connectivity between the ATCSCC specialists and the local traffic management coordinators.

The NAS shall have voice connectivity between the local traffic management coordinators and the ATCSCC specialists.

#### 3.5.2.4.3 Participating Aircraft Information

The NAS shall determine flight restrictions for specific aircraft.

The NAS shall generate trajectories for all aircraft participating in TM initiatives.

The NAS shall process requests for aircraft information relating to aircraft participating in TM strategies.

#### 3.5.2.4.3.1 Disseminate Aircraft Information

The NAS shall disseminate flight information of aircraft participating in TM initiatives to specialists.

The NAS shall disseminate the current location for each participating aircraft to TM specialists.

The NAS shall disseminate the current altitude for each participating aircraft to TM specialists.

The NAS shall disseminate the current speed for each participating aircraft to TM specialists.

The NAS shall disseminate the current track for each participating aircraft to TM specialists.

#### 3.5.2.4.3.1.1 Aircraft Information to ATCSCC Specialists

The NAS shall disseminate the projected altitude of each aircraft to ATCSCC specialists.

The NAS shall disseminate the projected speed of each aircraft to ATCSCC specialists.

The NAS shall disseminate the projected track of each aircraft to ATCSCC specialists.

#### 3.5.2.4.3.1.1.1 ATCSCC Aircraft Information Request

##### 3.5.2.4.3.1.1.1.1 Participating Aircraft Position

The NAS shall disseminate ATCSCC specialist requested aircraft position predictions within a means time of 3.0 seconds of the request.

The NAS shall disseminate ATCSCC specialist requested aircraft position predictions within the 99th percentile response time of 5.0 seconds of the request.

The NAS shall disseminate ATCSCC specialist requested aircraft position predictions within a maximum response time of request of 10.0 seconds of the request.

##### 3.5.2.4.3.1.1.1.2 Participating Aircraft Altitude

The NAS shall disseminate ATCSCC specialist requested aircraft altitude predictions within a means time of 3.0 seconds of the request.

The NAS shall disseminate ATCSCC specialist requested aircraft altitude predictions within the 99th percentile response time of 5.0 seconds of the request.

The NAS shall disseminate ATCSCC specialist requested aircraft altitude predictions within a maximum response time of request of 10.0 seconds of the request.

#### 3.5.2.4.3.1.1.3 Participating Aircraft Speed

The NAS shall disseminate ATCSCC specialist requested aircraft speed predictions within a means time of 3.0 seconds of the request.

The NAS shall disseminate ATCSCC specialist requested aircraft speed predictions within the 99th percentile response time of 5.0 seconds of the request.

#### 3.5.2.4.3.1.1.4 Participating Aircraft Heading

The NAS shall disseminate ATCSCC specialist requested aircraft heading predictions within a means time of 3.0 seconds of the request.

The NAS shall disseminate ATCSCC specialist requested aircraft heading predictions within the 99th percentile response time of 5.0 seconds of the request.

The NAS shall disseminate ATCSCC specialist requested aircraft heading predictions within a maximum response time of request of 10.0 seconds of the request.

The NAS shall disseminate ATCSCC specialist requested aircraft heading predictions within a maximum response time of request of 10.0 seconds of the request. (REPEAT)

#### 3.5.2.4.3.1.2 Aircraft Information to Local Traffic Management Coordinators

The NAS shall disseminate flight data information to local traffic management coordinators.

Information about each aircraft's position, altitude, speed, and track shall be provided to the local traffic management coordinators.

The NAS shall disseminate requested aircraft heading information to local traffic management coordinators within a means response time of 3 seconds of a request.

The NAS shall disseminate the projected location of each aircraft to local traffic management coordinators.

The NAS shall disseminate the projected altitude of each aircraft to local traffic management coordinators.

The NAS shall disseminate the projected speed of each aircraft to local traffic management coordinators.

The NAS shall disseminate the projected track of each aircraft to local traffic management coordinators.

The NAS shall disseminate the current track for each participating aircraft to local traffic management coordinators.

The NAS shall disseminate the current speed for each participating aircraft to local traffic management coordinators.

The NAS shall disseminate the current altitude for each participating aircraft to local traffic management coordinators.

The NAS shall disseminate the current location for each participating aircraft to local traffic management coordinators.

#### 3.5.2.4.3.1.2.1 Local Traffic Management Coordinators Information Request

The NAS shall accept aircraft track requests from local traffic management.

The NAS shall accept aircraft speed requests from local traffic management coordinators.

The NAS shall accept aircraft altitude requests from local traffic management coordinators.

The NAS shall accept aircraft position requests from local traffic management coordinators.

#### 3.5.2.4.3.1.2.1.1 Participating Aircraft Position

The NAS shall disseminate requested aircraft position information to local traffic management coordinators within a means response time of 3.0 seconds of a request.

The NAS shall disseminate requested aircraft position information to local traffic management coordinators within the 99th percentile response time of 5.0 seconds of a request.

The NAS shall disseminate requested aircraft position information to local traffic management coordinators within a maximum response time of 10.0 seconds of a request.

The NAS shall disseminate horizontal position information to local traffic management coordinators with accuracy greater than 1.0 (99th percentile) nautical miles for targets within a range up to 100 NMI of the primary surveillance detector.

The NAS shall disseminate horizontal position information to local traffic management coordinators with an accuracy of 2.04 (99th percentile) nautical miles for target ranges greater than 100 NMI of the primary surveillance detector.

#### 3.5.2.4.3.1.2.1.2 Participating Aircraft Altitude

The NAS shall disseminate requested aircraft altitude information to local traffic management coordinators within a means response time of 3.0 seconds of a request.

The NAS shall disseminate requested aircraft altitude information to local traffic management coordinators within the 99th percentile response time of 5.0 seconds of a request.

The NAS shall disseminate requested aircraft altitude information to local traffic management coordinators within a maximum response time of 10.0 seconds of a request.

#### 3.5.2.4.3.1.2.1.3 Participating Aircraft Heading

The NAS shall disseminate requested aircraft heading information to local traffic management coordinators within the 99th percentile response time of 5 seconds of a request.

The NAS shall disseminate requested aircraft heading information to local traffic management coordinators within a maximum response time of 10 seconds of a request.

The NAS shall disseminate requested aircraft track to the local traffic management coordinator with accuracy greater than 5 degrees for aircraft in straight-line flight.

#### 3.5.2.4.3.1.2.1.4 Participating Aircraft Speed

The NAS shall disseminate requested aircraft speed information to local traffic management coordinators within a means response time of 3.0 seconds of a request.

The NAS shall disseminate requested aircraft speed information to local traffic management coordinators within the 99th percentile response time of 5.0 seconds of a request.

The NAS shall disseminate requested aircraft speed information to local traffic management coordinators within a maximum response time of 10.0 seconds of a request.

The NAS shall disseminate requested aircraft speed to the local traffic management coordinator with accuracy greater than 20 knots for an aircraft in constant straight-line flight.

#### 3.5.2.4.3.2 Participating Aircraft Projection

The NAS shall utilize aircraft flight plan information for short-term projections.

The NAS shall utilize actual aircraft track for short-term projections.

The NAS shall utilize actual aircraft speed for short-term projections.

The NAS shall utilize actual aircraft position for short-term projections.

The NAS shall disseminate long-term projections based on flight plan information for the entire flight of the aircraft.

#### 3.5.2.5 Implement Traffic Flow Initiatives

The NAS shall implement traffic flow initiatives.

##### 3.5.2.5.1 Disseminate Derived Restrictions

###### 3.5.2.5.1.1 Disseminate Flow Control Information

The NAS shall disseminate flow control information to specialists.

The NAS shall disseminate pre-departure flow restriction alerts.

The NAS shall disseminate pre-departure airspace restriction alerts.

#### 3.5.2.5.1.2 Derived Restrictions to Specialists

The NAS shall disseminate derived alternate courses of action to the specialist.

The NAS shall disseminate derived restrictions to the specialist.

The NAS shall disseminate alternate courses of action relative to flight restrictions to specialists.

The NAS shall communicate flight restrictions to specialists.

#### 3.5.2.5.1.2.1 ATCSCC Specialists

The NAS shall disseminate alternate trial rerouting to ATCSCC specialists to resolve or minimize saturation conditions.

##### 3.5.2.5.1.2.1.1 ATCSCC Specialists' Requests

The NAS shall disseminate requested delay advisory information to ATCSCC specialists within a means response time of 3.0 seconds of the request.

The NAS shall disseminate requested delay advisory information to ATCSCC specialists within the 99th percentile response time of 5.0 seconds of the request.

The NAS shall disseminate requested delay advisory information to ATCSCC specialists within a maximum response time of 10.0 seconds of the request.

The NAS shall disseminate requested flow control advisory information to ATCSCC specialists within a means response time of 3.0 seconds of the request.

The NAS shall disseminate requested flow control advisory information to ATCSCC specialists within the 99th percentile response time of 5.0 seconds of the request.

The NAS shall disseminate requested flow control advisory information to ATCSCC specialists within a maximum response time of 10.0 seconds of the request.

#### 3.5.2.5.1.2.2 Traffic Flow Management Specialists

The NAS shall disseminate flow control information to traffic management specialists via NAS voice communications.

The NAS shall disseminate flow control information to local traffic management specialists via NAS data communications.

The NAS shall disseminate flow control information to traffic management coordinators via NAS data communications.

The NAS shall disseminate flow control information to traffic management specialists via NAS voice communications.

The NAS shall disseminate flow control information to traffic management specialists via NAS data communications.

The NAS shall distribute alternate trial rerouting to the local Traffic Management Coordinator to resolve or minimize saturation conditions.

The NAS shall disseminate local flow restrictions to local traffic management coordinators.

The NAS shall disseminate interfacility flow restrictions to local traffic management coordinators.

##### 3.5.2.5.1.2.2.1 Traffic Flow Management Requests

###### 3.5.2.5.1.2.2.1.1 Request for Delay Advisories

The NAS shall disseminate requested delay advisory information to local traffic management specialists within a means response time of 3.0 seconds of the request.

The NAS shall disseminate requested delay advisory information to local traffic management specialists within the 99th percentile response time of 5.0 seconds of the request.

The NAS shall disseminate requested delay advisory information to local traffic management specialists within a maximum response time of 10.0 seconds of the request.

#### 3.5.2.5.1.2.2.1.2 Request for Flow Control Advisories

The NAS shall disseminate requested flow control advisory information to local traffic management specialists within a means response time of 3.0 seconds of the request.

The NAS shall disseminate requested flow control advisory information to local traffic management specialists within the 99th percentile response time of 5.0 seconds of the request.

The NAS shall disseminate requested flow control advisory information to local traffic management specialists within a maximum response time of 10.0 seconds of the request.

#### 3.5.2.5.1.3 Derived Restrictions to Users

##### 3.5.2.5.1.3.1 Disseminate Flow Control Information

The NAS shall disseminate derived restrictions to the user.

The NAS shall disseminate derived alternative courses of action to the user.

The NAS shall disseminate flight restrictions to users.

The NAS shall disseminate alternate courses of action relative to flight restrictions to users.

The NAS shall disseminate flow control information to users via external voice communications.

The NAS shall disseminate flow control information to users via external data interfaces.

##### 3.5.2.5.1.3.2 User Requests for Information

###### 3.5.2.5.1.3.2.1 Flow Control Advisories

The NAS shall disseminate requested flow control advisory information to users within a means response time of 3.0 seconds of the request.

The NAS shall disseminate requested flow control advisory information to users within a 99th percentile response time of 5.0 seconds of the request.

The NAS shall disseminate requested flow control advisory information to users within a maximum response time of 10.0 seconds of the request.

###### 3.5.2.5.1.3.2.2 Delay Advisories

The NAS shall disseminate requested delay advisory information to users within a means response time of 3.0 seconds of the request.

The NAS shall disseminate requested delay advisory information to users within a 99th percentile response time of 5.0 seconds of the request.

The NAS shall disseminate requested delay advisory information to users within a maximum response time of 10.0 seconds of the request.

#### 3.5.2.5.2 Non-Compliance

The NAS shall detect current clearance-based trajectories that are in noncompliance with flow restrictions.

The NAS shall disseminate advisories to the specialist to resolve noncompliance of current clearance-based trajectories with flow restrictions.

#### 3.5.2.6 Modify Current Flow Strategies

The NAS shall modify current flow strategies.



The NAS shall generate alternate plans to alleviate traffic flow problems

### 3.5.3 Performance Assessment

#### 3.5.3.1 Flight Day Performance Information

The NAS shall store flight day performance information.

The NAS shall retrieve flight day performance information.

The NAS shall archive flight day performance information.

The NAS shall record flight day performance information.

#### 3.5.3.2 Assess the system performance of the NAS.

The NAS shall assess the system performance of the NAS.

The NAS shall evaluate the effectiveness of flow restrictions implemented in the NAS.

#### 3.5.3.3 Identify deficiencies in the capacity of selected airspace.

The NAS shall identify deficiencies in the capacity of selected airspace.

The NAS shall generate proposals to correct the identified capacity deficiencies.

### 3.6 Emergency and Alerting

#### 3.6.1 Emergency Assistance

##### 3.6.1.1 Emergency Response

The NAS shall accept an emergency transmission from any user declaring an emergency.

The NAS shall recommend courses of action to any user declaring an emergency.

The NAS shall record all received emergency communications.

The NAS shall record all transmitted emergency communications.

The NAS shall store all recorded emergency communications.

The NAS shall archive all recorded emergency communications.

The NAS shall communicate with a user that has declared an emergency on the existing channel or frequency until frequency is unavailable.

The NAS shall evaluate alternate courses of action to expedite resolution of emergency situations.

The NAS shall disseminate emergency information over commercially available communications systems.

##### 3.6.1.2 Search and Rescue

The NAS shall process airspace reservations submitted by aircraft.

The NAS shall alert specialists when the flight exceeds 30 minutes past its expected time of arrival (ETA).

The NAS shall accept flight plan amendments received from search and rescue aircraft.

The NAS shall accept flight plan amendments received from search and rescue agencies.

The NAS shall accept airspace reservations from search and rescue aircraft.

The NAS shall accept airspace reservations from search and rescue agencies.

The NAS shall disseminate essential information on missing aircraft.

The NAS shall retrieve essential information on missing aircraft.

The NAS shall retrieve essential information on overdue aircraft.

The NAS shall assist with search and rescue activities.

The NAS shall respond to emergency transmissions received via landline.

The NAS shall respond to emergency transmissions received via data link.

The NAS shall respond to emergency transmissions received via radar beacon.

The NAS shall respond to emergency transmission received via radio communications.

The NAS shall respond to requests for assistance from in-flight users.

#### 3.6.1.3 Emergency Information Dissemination

The NAS shall disseminate information about an emergency to affected ATC facilities.

The NAS shall alert other ATC specialists along the proposed route of an aircraft when an apparent failure of on board air-ground communications is detected.

The NAS shall disseminate to specialists geographic coordinates of ELT transmission sites upon determination of the coordinates based on the report of detection from a non-ATC source.

The NAS shall disseminate to specialists geographic coordinates of ELT transmission sites upon detection of the transmission.

The NAS shall disseminate essential emergency information to the specialist on request.

The NAS shall deliver alerts that repeat.

The NAS shall deliver alerts that must be manually deactivated by the specialist.

The NAS shall deliver aural alerts to the specialist.

The NAS shall deliver visual alerts to the specialist.

The NAS shall exchange Essential Information and Emergency Alert Information with External Agencies Cooperating in Search and Rescue via voice communications systems.

The NAS shall exchange Essential Information and Emergency Alert Information with External Agencies Cooperating in Search and Rescue via external data interfaces.

The NAS shall exchange Essential Information and Emergency Alert Information with aircraft in the area via voice communications systems.

The NAS shall exchange Essential Information and Emergency Alert Information with aircraft in the area via external data interfaces.

The NAS shall exchange Essential Information and Emergency Alert Information between specialists via voice communications systems.

The NAS shall exchange Essential Information and Emergency Alert Information between specialists via external data interfaces.

#### 3.6.1.4 Emergency Alert Information

The NAS shall disseminate magnetic heading to navigational aids upon user request.

The NAS shall disseminate magnetic heading to suitable aerodromes upon user request.

The NAS shall disseminate distance to suitable navigational aids upon user request.

The NAS shall disseminate distance to suitable aerodromes upon user request.

The NAS shall disseminate the location of an aircraft equipped with a functioning VHF transceiver in designated areas greater than or equal to 2000 feet AGL independent of surveillance capabilities.

The NAS shall determine the location of an aircraft equipped with a functioning VHF transceiver in designated areas greater than or equal to 2000 feet AGL independent of surveillance capabilities.

The NAS shall disseminate altitude of an aircraft with respect to known geographic positions to specialists.

The NAS shall disseminate range of an aircraft with respect to known geographic positions to specialists.

The NAS shall disseminate azimuth of an aircraft with respect to known geographic positions to specialists.

The NAS shall disseminate essential emergency information upon receipt of specialists' request.

The NAS shall disseminate amended flight plan data upon receipt of specialists' request.

The NAS shall disseminate original flight plan data upon receipt of specialists' request.

The NAS shall retrieve original flight plan data upon receipt of specialists' request.

The NAS shall disseminate information to users who have lost normal communications via alternate means.

The NAS shall alert ATC specialists at the proposed destination of an aircraft when an apparent failure of on board air-ground communications is detected.

The NAS shall disseminate emergency resolution recommendations to the specialist.

The NAS shall transmit aerodrome recommendations to expedite resolution of emergency situations.

The NAS shall transmit conflict-free flight path recommendations to expedite resolution of emergency situations.

The NAS shall alert private agencies to the existence of an emergency.

The NAS shall alert local government agencies to the existence of an emergency.

The NAS shall alert state agencies to the existence of an emergency.

The NAS shall alert federal agencies to the existence of an emergency.

The NAS shall alert foreign agencies to the existence of an emergency.

The NAS shall alert ATC facilities to the existence of an emergency.

#### 3.6.1.5 Emergency Evaluation

The NAS shall analyze ELT transmission reports from satellites.

The NAS shall analyze ELT transmission reports from amateur radio operators.

The NAS shall analyze ELT transmission reports from pilots.

The NAS shall calculate the location of an aircraft in an emergency situation.

#### 3.6.1.6 Emergency Information Processing

The NAS shall store essential emergency information.

The NAS shall accept ELT transmission reports from satellites.

The NAS shall accept ELT transmission reports from amateur radio operators.

The NAS shall accept ELT transmission reports from pilots.

The NAS shall acquire emergency information over commercially available communications systems.

#### 3.6.2 Alerting Support

#### 3.6.2.1 Emergency Transmission Monitoring

The NAS shall monitor ELT transmission at AFSS facilities.

The NAS shall monitor ELT transmission at TRACON facilities.

The NAS shall monitor ELT transmission at ATCT facilities.

The NAS shall monitor ELT transmission at ARTCC facilities.

The NAS shall monitor transmissions from Emergency Locator Transmitters (ELT) continuously.

The NAS shall monitor flight progress to ensure timely emergency assistance.

The NAS shall continuously monitor air-to-ground communications utilizing designated frequencies for detection of emergency transmissions.

The NAS shall monitor emergency transmissions received via landline.

The NAS shall continuously monitor emergency transmission via data link.

The NAS shall continuously monitor emergency transmission via radar beacon.

The NAS shall continuously monitor emergency transmissions via radio communications.

#### 3.6.2.2 Emergency Communication Support

The NAS shall maintain emergency communications compatible with DoD.

The NAS shall maintain emergency communications compatible with fire departments.

The NAS shall maintain emergency communications compatible with local police officials.

The NAS shall maintain emergency communications compatible with amateur radio operators.

The NAS shall maintain emergency communications compatible with Civil Defense.

The NAS shall maintain emergency communications compatible with FEMA.

The NAS shall maintain emergency communications compatible with U.S. Coast Guard.

The NAS shall maintain emergency communications compatible with military command posts.

The NAS shall maintain emergency communications compatible with NCA.

#### 3.6.2.3 Emergency Detection

The NAS shall initiate search and rescue activities.

The NAS shall alert specialists when the time for re-establishing contact with an aircraft operating over NAS-designated hazardous areas exceeds 15 minutes.

The NAS shall detect unreported aircraft located outside the NAS area of coverage but within Flight Information Regions.

The NAS shall detect overdue aircraft located outside the NAS area of coverage but within Flight Information Regions.

The NAS shall detect unreported aircraft.

The NAS shall detect overdue aircraft.

The NAS shall detect unreported aircraft.

The NAS shall detect overdue aircraft.

The NAS shall process airspace reservations submitted by search and rescue agencies.

The NAS shall disseminate to the specialist a list of aerodromes located within a 100-mile-wide corridor along the projected route from the last known position for overdue aircraft.

The NAS shall disseminate emergency alert information selected by the specialist.

The NAS shall disseminate Search and Rescue information to specialists.

The NAS shall exchange information with agencies involved in search and rescue activities.

The NAS shall coordinate with agencies involved in search and rescue activities.

The NAS shall maintain a hazardous area reporting service for users operating in NAS designated lake areas.

The NAS shall maintain a hazardous area reporting service for users operating in NAS designated island areas.

The NAS shall maintain a hazardous area reporting service for users operating in NAS designated mountain areas.

The NAS shall maintain a hazardous area reporting service for users operating in NAS designated swamp areas.

The NAS shall deliver systems that alert specialists when a flight receiving flight following services is overdue.

The NAS shall initiate emergency procedures when a specialist deems aircraft is overdue.

The NAS shall disseminate to the specialist a prioritized list of facilities to be notified in to begin a communications search for overdue aircraft.

The NAS shall disseminate to the specialist any historical information on an overdue aircraft that may aid in the communications search.

The NAS shall disseminate to the specialist any historical information on a pilot that may aid in the communications search.

The NAS shall disseminate essential emergency information to agencies involved in search and rescue activities.

### 3.7 Navigation

#### 3.7.1 Airborne Guidance

The NAS shall disseminate aeronautical fix information to NAS users.

The NAS shall disseminate the geodetic location of navigational reference point using a FAA approved datum.

The NAS shall establish a navigation network that is compatible with NAS-approved user equipment

The NAS shall coordinate navigation guidance information reception requirements between en route and terminal area navigation systems to minimize equipment costs to users.

The NAS shall support the development and certification (NAS and ICAO) of modern systems of aircraft navigation which meet or exceed current standards and are not currently part of the NAS navigation systems. This is a Policy statement - not a requirement\*\*

The NAS shall comply with ICAO navigation guidance information requirement.

The NAS shall generate en route navigation guidance information designated for primary means of navigation.

The NAS shall disseminate navigation guidance information designated for primary means of navigation.

The NAS shall support en route navigation guidance information designated for supplemental means of navigation.

The NAS shall coordinate navigation guidance information reception requirements between en route and terminal area navigation systems to minimize equipment costs to users.

The NAS shall disseminate a unique identifier for each en route ground-bases navigational guidance information sources.

The NAS shall disseminate relative bearing navigation guidance information that is in alignment with locally defined magnetic bearings.

The NAS shall generate navigation guidance information for aircraft operating under instrument meteorological conditions.

The NAS shall disseminate navigation guidance information to areas of NAS responsibility.

The NAS ground-based navigational aids shall transmit a unique identification signal within its area of signal coverage.

#### 3.7.1.1 All weather airborne navigation guidance

##### 3.7.1.1.1 En route airborne navigation guidance

The NAS shall generate space-based en route altitude navigation guidance information.

The NAS shall disseminate space-based en route altitude navigation guidance information.

The NAS shall generate en route position guidance navigation information.

The NAS shall generate ground-based relative position guidance information for en route navigation.

The NAS shall disseminate theta reference information about en route ground-based navigation aids providing relative bearing navigation guidance information in navigation charts.

The NAS shall disseminate en route theta ( $q$ ) navigation guidance information to an unlimited number of aircraft simultaneously.

The NAS shall align angular guidance information (theta) of ground-based en route navigation information with the local magnetic-bearing reference system.

The NAS shall align the origin of en route ground-based angular (theta) guidance information with the corresponding geographical coordinates.

The NAS shall disseminate en route rho ( $r$ ) navigation guidance distance information to no less than 100 aircraft, concurrently.

##### 3.7.1.1.1.1 En route path guidance

The NAS shall generate en route navigational path guidance information.

The NAS shall generate en route navigation course deviation guidance information.

The NAS shall disseminate en route path guidance navigation information.

The NAS shall disseminate en route navigation course deviation guidance information.

The NAS shall disseminate en route deviation-from-selected-course navigational guidance information at an update rates sufficient to support coupled autopilot operation.

##### 3.7.1.1.1.2 En route position guidance

The NAS shall generate space-based en route geographic position navigation guidance information.

The NAS shall disseminate space-based en route geographic position navigation guidance information.

The NAS shall disseminate en route position guidance navigation information.

The NAS shall disseminate en route relative position navigation guidance information.

The NAS shall disseminate ground-based relative position guidance information for en route navigation.

The NAS shall disseminate en route position navigational guidance information at an update rates sufficient to support coupled autopilot operations.

The NAS should disseminate space-based en route position guidance information to an unlimited number of aircraft, simultaneously.

##### 3.7.1.1.1.3 Accuracy of en route guidance information

The NAS shall disseminate space-based en route navigation guidance information such that the probability of detecting hazardously misleading information is less than  $1.0 \times 10^{-6}$  per hour.

The NAS shall support the detection of space-based en route horizontal position navigation guidance information with a 95th percentile horizontal radial position error (R-95) less than or equal to 328 feet (100 meters)

#### 3.7.1.1.1.4 Continuity of en route navigation service

The NAS shall disseminate space-based en route navigation guidance information with a continuity of navigation service of at least 1-(1.0x10) per hour.

The NAS shall disseminate navigational guidance information on a continuous basis.

#### 3.7.1.1.1.5 Area specific en route navigation guidance service

The NAS shall disseminate en route navigational guidance information to remote areas, between 500 feet AGL and FL 600 for course guidance along normal density traffic routes with a maximum width of 20 nmi.

The NAS shall disseminate navigational guidance information for limited-use applications, such as rotorcraft, between 500 feet above the surface to 5000 feet for course guidance along low traffic density, offshore routes with a maximum width of 8 nmi.

The NAS shall disseminate navigation guidance information to off-shore oceanic areas between the altitudes of FL 275 and FL 400 for course guidance along normal density traffic routes of widths less than 60 nmi.

The NAS shall disseminate navigational guidance information in domestic areas, between 500 feet AGL and flight level 600 for course guidance along normal density traffic route of widths less than 8 NMI.

The NAS shall disseminate en route navigation guidance information in NAS controlled airspace between 2000 feet AGL and Flight Level 600.

#### 3.7.1.1.2 Terminal area airborne navigation guidance

The NAS shall generate terminal navigation guidance information.

The NAS shall generate terminal navigational guidance information under all weather conditions.

The NAS shall generate ground-based terminal navigation aeronautical fix relative distance guidance information.

The NAS shall generate ground-based terminal navigation aeronautical fix relative bearing guidance information.

The NAS shall disseminate terminal navigational guidance information under all weather conditions.

The NAS shall disseminate terminal navigation guidance information.

The NAS shall disseminate unambiguous terminal navigational guidance.

The NAS shall certify terminal navigation aids as meeting or exceeding ICAO standards.

The NAS shall disseminate terminal navigation guidance deviation-from-selected-course information.

##### 3.7.1.1.2.1 Terminal navigation guidance, vertical

The NAS shall disseminate terminal navigation guidance information to enable users to determine aircraft position on a vertical plane.

##### 3.7.1.1.2.2 Terminal navigation guidance, lateral

The NAS shall generate terminal area relative distance navigation information for a minimum of 100 aircraft, concurrently.

The NAS shall disseminate terminal navigation guidance information to enable users to determine aircraft position on a horizontal plane.

The NAS shall disseminate terminal navigational guidance information with sufficient accuracy to support establishing routes within terminal service volumes with widths 4 nmi or less.

The NAS shall disseminate terminal navigation guidance information to enable users to determine distance information.

The NAS shall disseminate space-based navigation guidance information for terminal navigation with a 95th percentile horizontal radial position error (R-95) less than or equal to 328 feet (100 meters).

The NAS shall disseminate space-based navigation guidance information in terminal areas with a 95th percentile horizontal radial position error (R-95) of 328 feet (100 meters).

The NAS shall disseminate terminal area relative distance navigation information for a minimum of 100 aircraft, concurrently.



The NAS shall disseminate ground-based terminal navigation aeronautical fix relative bearing guidance information.

The NAS shall disseminate ground-based terminal navigation aeronautical fix relative distance guidance.

The NAS shall disseminate available supplemental terminal navigation guidance information error correction values to Specialists.

The NAS shall disseminate available supplemental terminal navigation guidance information error correction values to users.

#### 3.7.1.1.3 Airport area navigation guidance

##### 3.7.1.1.3.1 Airport approach guidance

###### 3.7.1.1.3.1.1 All weather airport approach guidance

The NAS shall generate approach navigation guidance information at designated aerodromes.

The NAS shall disseminate approach navigation guidance information at designated aerodromes.

The NAS shall generate landing navigation guidance information at designated aerodromes.

The NAS shall disseminate landing navigation guidance information at designated aerodromes.

###### 3.7.1.1.3.1.1.1 All weather non-precision approach navigation guidance

The NAS shall disseminate navigational guidance information for established non-precision approach and landing routes.

The NAS shall disseminate space-based navigation guidance information for non-precision approaches with a 95th percentile horizontal radial position error (R-95) less than or equal to 328 feet (100 meters).

The NAS shall disseminate space-based navigation guidance information for non-precision approaches with integrity such that the probability of broadcasting hazardously misleading information is less than  $1.0 \times 10$  per hour.

The NAS shall disseminate space-based navigation guidance information for non-precision approaches with a continuity of not less than  $1.0 - (1.0 \times 10)$  per hour.

The NAS shall generate space-based non-precision approach navigation guidance information with an availability of navigation and fault detection information greater than  $1 - (1.0 \times 10)$ .

The NAS shall disseminate lateral navigation guidance information to non-precision approach missed approach points with a cross-track accuracy of 0.3 nmi.

The NAS shall disseminate non-precision approach missed-approach position guidance information to users.

###### 3.7.1.1.3.1.1.2 All weather precision approach guidance

The NAS shall disseminate precision navigational guidance in terminal approach sectors.

The NAS shall disseminate precision-landing glide path guidance information to an unlimited number of aircraft.

The NAS shall disseminate space-based navigation guidance information within designated precision approach performance boundary.

The NAS shall generate precision approach navigational guidance in terminal approach sectors.

The NAS shall generate autonomous precision-landing lateral course guidance information.

The NAS shall disseminate precision approach relative distance navigation information to minimum of 100 aircraft, concurrently.

The NAS shall generate precision approach relative distance navigation information for a minimum of 100 aircraft, concurrently.

The NAS shall disseminate navigation guidance position information for precision approaches at an update rate sufficient to support coupled autopilot operations.

The NAS shall disseminate deviations from-selected-course navigation information for precision approaches at an update rate sufficient to support coupled autopilot operations.

The NAS shall disseminate precision-landing lateral course guidance information to an unlimited number of aircraft.

The NAS shall generate precision-landing glide path guidance information for an unlimited number of aircraft.

The NAS shall define the minimum volume limits of a terminal precision approach sector such that the area defined by a 20 nmi radius arc (with the vertex at the landing zone) sweeping through an angle from +40 to -40 degrees of the precision approach centerline, and arc area then swept vertical from a 0.9 degrees to 15 degrees above the an earth tangent plane at the landing surface, is inside the volume of the approach sector.

#### 3.7.1.1.3.1.1.2.1 Category I approach navigation guidance

The NAS shall disseminate space-based navigation guidance information for Category I approaches with the probability of presenting hazardously misleading information of less than  $1.3 \times 10^{-10}$  per approach.

The NAS shall disseminate space-based navigation guidance information for Category I approaches with a continuity of navigation function no less than 1.0 - ( $1.0 \times 10^{-10}$ ) per approach.

The NAS shall disseminate space-based navigation guidance information for Category I approaches with a probability of generating hazardously misleading information within a precision approach performance boundary of less than  $1.0 \times 10^{-10}$ .

The NAS shall disseminate space-based Category I precision approach guidance information that qualifies as a sole means of navigation for at least 150 second from the time an aircraft cross the final approach fix.

The NAS shall disseminate space-based Category I precision approach sole means of navigation guidance information between the final approach fix and the point designated for missed approach (at 200 feet).

The NAS shall disseminate space-based navigation guidance information augmentation for Category I approaches from a designated final approach fix to a point on the approach path 200 feet above the runway threshold.

The NAS shall disseminate space-based navigation guidance information for designated Category I approaches between the altitudes of 100 and 3000 feet above the surface.

The NAS shall disseminate space-based Category I approach navigation guidance information with a 95th percentile spherical radial position error of 20.0 feet (6.20 meters).

#### 3.7.1.1.3.1.1.2.1.1 Category I approach guidance

The NAS shall disseminate ground-based approach slope guidance information for Category I approaches between the altitudes of 100 and 3000 feet AGL along the approach path.

The NAS shall disseminate ground-based navigation guidance information for Category I approaches with vertical accuracies of + 10 feet (+ 3.0 meters), 100 feet AGL at the middle marker.

The NAS shall disseminate space-based Category I approach navigation guidance information with a 95th percentile vertical error of 32 feet at the point designated for missed approach (200 feet AGL).

The NAS shall disseminate ground-based Category I approach lateral navigation guidance information between the altitudes of 100 and 3000 feet AGL along the approach path.

The NAS shall disseminate ground-based navigation guidance information for Category I approaches with lateral accuracies of + 30 feet (+ 9.1 meters), 100 feet AGL at the middle marker.

The NAS shall disseminate space-based Category I lateral navigation approach guidance information with a 95th percentile horizontal radial position error (R-95) less than or equal to 110 feet at the point designated for missed approach (200 feet AGL).

#### 3.7.1.1.3.1.1.2.2 Category II approach guidance

The NAS shall disseminate ground-based approach slope guidance information for Category II approaches between the altitudes of 50 and 3000 feet AGL, along the approach path.

The NAS shall disseminate ground-based navigation guidance information for Category II approaches with vertical accuracies of + 4 feet (+ 1.2 meters) 50 feet AGL at the inner marker.

The NAS shall disseminate ground-based lateral navigation guidance information for Category II approaches between the altitudes of 50 and 3000 feet AGL, along the corresponding approach path.

The NAS shall disseminate ground-based navigation guidance information for Category II approaches with lateral accuracies of + 15 feet (+ 4.6 meters), at 50 feet AGL, at the inner marker.

#### 3.7.1.1.3.1.2.3 Category III approach guidance

The NAS shall disseminate ground-based approach slope guidance for Category III approaches between the surface and 3000 feet AGL, along the approach path.

The NAS shall disseminate ground-based navigation guidance information for Category III approaches with vertical accuracies of + 1.2 feet (+ 0.4 meters), at 8 feet above the surface of the runway.

The NAS shall disseminate ground-based lateral navigation guidance for Category III approaches between the surface and 3000 feet AGL, along the approach path.

The NAS shall disseminate ground-based navigation guidance information for Category III approaches with lateral accuracies of + 13.5 feet (+ 4.1 meters), at 8 feet above the surface of the runway.

#### 3.7.1.1.3.2 Airport departure navigation guidance

The NAS shall disseminate departure navigation guidance information at designated aerodromes.

The NAS shall generate departure navigation guidance information at designated aerodromes.

#### 3.7.1.2 Visual approach guidance

The NAS shall generate visual landing alignment guidance information.

The NAS shall implement intensity control of visual approach guidance information by specialists.

The NAS shall align instrument approach visual navigation guidance with the touchdown area centerline.

The NAS shall generate visual approach guidance that clearly identifies the type of landing area.

The NAS shall generate instrument approach visual navigation guidance at designated aerodromes.

The NAS shall generate visual approach slope guidance at designated aerodromes.

The NAS shall generate visual approach slope guidance with an effective visual range of no less than 3 miles during daylight hours.

The NAS shall generate visual approach slope guidance with an effective visual range of no less than 20 miles during night hours.

The NAS shall generate visual navigation approach slope guidance at designated airports to a distance no less than 4 nmi from the touchdown zone.

The NAS shall generate visual approach slope navigational guidance at designated heliports starting at a minimum distance of 4 nmi from the landing zone to a distance no less than 0.66 nmi from the landing zone.

#### 3.7.1.2.1 Visual approach slope guidance

The NAS shall generate a visual indication of acceptable-approach slope guidance at designated aerodromes.

The NAS shall generate a visual indication of unacceptable approach slope guidance at designated aerodromes.

The NAS shall generate visual navigation guidance for offset visual approaches as dictated by individual aerodrome characteristics.

The NAS shall generate visual navigation guidance for straight-in visual approaches as dictated by individual aerodrome characteristics.

The NAS shall generate visual landing guidance for curved approaches to supplement electronic approach landing guidance as dictated by aerodrome characteristics.

The NAS shall generate visual landing guidance for offset approaches to supplement electronic approach landing guidance as dictated by aerodrome characteristics.

The NAS shall generate visual landing guidance for high angle approaches to supplement electronic approach landing guidance as dictated by aerodrome characteristics.

The NAS shall generate visual landing guidance for straight-in approaches to supplement electronic approach landing guidance as dictated by aerodrome characteristics.

#### 3.7.1.2.2 Visual non-precision approach guidance

The NAS shall generate non-precision instrument approach runway visual navigation guidance from the runway threshold to no less than 400 feet in the direction of the approach.

The NAS shall generate visual navigation guidance for curved non-precision approaches as dictated by individual aerodrome characteristics.

The NAS shall generate visual navigation guidance for offset non-precision approaches as dictated by individual aerodrome characteristics.

The NAS shall generate visual navigation guidance for straight-in non-precision approaches as dictated by individual aerodrome characteristics.

#### 3.7.1.2.3 Precision visual approach guidance

The NAS shall generate precision instrument approach runway visual navigation guidance from the landing threshold to a distance no less than 2400 feet in the approach direction.

The NAS shall generate helipad precision instrument approach visual navigation guidance from the landing threshold to a distance no less than 1000 feet in the direction of the approach.

The NAS shall generate visual navigation guidance for straight-in precision approaches as dictated by individual aerodrome characteristics.

The NAS shall generate visual navigation guidance for offset precision approaches as dictated by individual aerodrome characteristics.

The NAS shall generate visual navigation guidance for curved precision approaches as dictated by individual aerodrome characteristics.

The NAS shall generate visual navigation guidance for curved visual approaches as dictated by individual aerodrome characteristics.

#### 3.7.1.2.4 Visual obstacle avoidance guidance

The NAS disseminate nighttime visual navigation guidance information from airspace obstacles for a minimum range of 20 nmi in clear weather.

The NAS shall verify the proper marking of obstructions in the vicinity of the landing area.

### 3.7.2 Surface Guidance

The NAS shall generate visual navigation guidance that identifies those permanent obstructions on the aerodrome surface that could pose a threat to taxiing aircraft.

The NAS shall generate airport surface visual markings navigation information.

## 3.8 Airspace Management

### 3.8.1 Airspace Design

#### 3.8.1.1 Design airspace structures

The NAS shall establish non-precision approach routes that allow for a 0.6 nmi cross-track error at the missed approach point.

The NAS shall establish non-precision approach and landing routes with route widths 2 nmi or less between 250 feet and 3000 feet above the surface.

The NAS shall establish the terminal area service volume between 500 feet above the surface and flight level 180.

The NAS shall establish the location of each navigational reference point in latitude and longitude coordinates using WGS-84 or equivalent datum.

The NAS shall disseminate navigational guidance information for limited-use applications (e.g. rotorcraft) between 500 feet AGL and 3000 feet AGL suitable for use in course guidance within high-density traffic routes with a maximum width of 4 nmi.

The NAS shall establish a grid so that every point in the United States is within 1 nautical mile of a grid point.

The NAS shall acquire location information accurate to within one arc second for all known obstacles whose height exceeds the surrounding

terrain by 200 feet throughout the area of US delegated airspace.

The NAS shall establish the minimum safe altitude for flight over all areas of US delegate airspace.

The NAS shall ensure ATC specialist has an unobstructed 360-degree view of the airport movement area from the Tower Cab.

The NAS shall acquire data on boundaries of special use airspace.

#### 3.8.1.2 Disseminate airspace designs to users

The NAS shall disseminate complete information on ground and terrain elevation.

#### 3.8.2 Airspace Management

##### 3.8.2.1 Classify volumes of airspace.

The NAS shall develop airspace sectors based on the characteristics of aircraft operating in airspace volumes.

##### 3.8.2.2 Disseminate airspace sectors for volumes of airspace

The NAS shall disseminate ATC facility boundary data anywhere in the NAS coverage as needed to specialists at the ATCSCC.

##### 3.8.2.3 Designate airspace for special use

The NAS shall store boundaries of special use airspace.

#### 3.9 Infrastructure/Information Management

##### 3.9.1 Monitoring and Maintenance

##### 3.9.1.1 Management of NAS facilities

###### 3.9.1.1.1 Maintain facilities

The NAS shall maintain facilities in accordance with appropriate standards.

The NAS shall establish and locate repair facilities to facilitate the service and return of repairable items to sites in minimum time and at the lowest possible cost.

The NAS shall provide dependable and adequate heating/ventilating/air conditioning (HVAC) systems to provide an optimized operating environment for equipment and personnel.

The NAS shall control ambient noise inside manned NAS facilities to foster maximum efficiency of specialists.

The NAS shall provide manned facilities with electrical power system that ensures maximum availability of services.

The NAS shall remotely monitor and control access to unmanned facilities to prevent interruption of service, unauthorized access to computers, theft, and damage to government property.

The NAS shall provide a terminal interface at unmanned facilities for use with portable maintenance data terminals.

The NAS shall use unmanned facilities equipped with systems for facility remote control.

The NAS shall provide physical access to specialists to perform maintenance activities.

##### 3.9.1.2 Facility Design

###### 3.9.1.2.1 Design Unmanned Facilities

The NAS shall construct unmanned facilities to applicable agency and local standards to protect the installed equipment from the adverse weather conditions and natural disasters.

The NAS shall design unmanned facilities to ensure a safe environment for installed equipment in accordance with appropriate standards.

The NAS shall design unmanned facilities to ensure a secure environment for installed equipment in accordance with appropriate standards.

The NAS shall design unmanned facilities to provide a safe work environment.

The NAS shall design unmanned facilities to provide a secure work environment.

The NAS shall design unmanned facilities to provide a reliable work environment.

The NAS shall design unmanned facilities to provide an adequate work environment.

The NAS shall design remote facilities on-site maintenance actions to occur no more frequently than once every 90 days.

#### 3.9.1.2.2 Unmanned facility inspections

The NAS shall perform physical inspections of unmanned facilities.

The NAS shall calibrate the operating equipment at unmanned facilities.

The NAS shall calibrate monitoring devices at unmanned facilities.

The NAS shall replace LRUs of operating equipment at unmanned facilities.

The NAS shall verify operating equipment at unmanned facilities.

The NAS shall adjust monitored parameters of designated systems from designated remote locations to keep parameters within specified ranges.

The NAS shall perform maintenance activities at intermediate level repair facilities.

The NAS shall trigger backup equipment designated systems from designated remote locations in the event of equipment performance degradation.

The NAS shall certify equipment performance of designated systems from designated remote locations.

The NAS shall adjust performance of operational systems from local positions.

The NAS shall verify that operational system adjustments are correct from local locations.

The NAS shall locate unmanned sites to achieve maximum effectiveness of installed equipment.

#### 3.9.1.2.3 Design manned facilities

The NAS shall design manned facilities to agency and local standards to protect personnel and equipment from the adverse weather conditions and natural disasters that may be expected to occur at a site.

The NAS shall design manned facilities to ensure a safe working environment in accordance with OSHA standards.

The NAS shall design manned facilities to ensure a secure working environment in accordance with OSHA standards.

The NAS shall design manned facilities in accordance with human engineering practices to provide a safe work environment.

The NAS shall design manned facilities in accordance with human engineering practices to provide a secure work environment.

The NAS shall design manned facilities in accordance with human engineering practices to provide a reliable work environment.

The NAS shall design manned facilities in accordance with human engineering practices to provide an adequate work environment.

The NAS shall comply with all Occupational Safety and Health Administration (OSHA), FAA, and local safety and sanitary regulations.

The NAS shall provide adequate space for work environment, personnel, storage, and equipment to include coverage and EMC.

The NAS shall establish facilities necessary to perform maintenance activities.

The NAS shall evaluate costs in establishing facilities.

The NAS shall consolidate repair facilities wherever possible.

The NAS shall use system assets for maintenance.

The NAS shall use unmanned facilities equipped with electrical power systems commensurate with facility criticality.

### 3.9.1.3 Monitor NAS resource status

#### 3.9.1.3.1 Monitor system status

The NAS shall monitor the system status of operational systems.

The NAS shall monitor navigation systems' operational status.

The NAS shall monitor designated supplemental navigation guidance.

The NAS shall acquire navigation guidance.

The NAS shall monitor the status of all display systems.

The NAS shall monitor status of surveillance equipment.

The NAS shall monitor status of navigational systems.

The NAS shall monitor status of approach systems.

The NAS shall monitor status of landing aids.

The NAS shall monitor terminal navigation equipment status for designated aerodromes.

The NAS shall monitor signals from designated supplemental navigational systems.

The NAS shall monitor signals from designated supplemental navigation systems.

The NAS shall alert the specialist upon detection of fire from any system.

The NAS shall use system assets for remote monitoring.

#### 3.9.1.3.1.1 Monitor equipment performance parameters

The NAS shall monitor equipment parameters.

The NAS shall analyze monitored equipment parameters.

The NAS shall monitor operational performance parameters.

The NAS shall monitor navigational operational performance parameters.

The NAS shall monitor the performance of all equipment.

The NAS shall monitor parameters of all critical systems.

The NAS shall monitor operational performance of navigation systems.

The NAS shall monitor performance of surveillance equipment.

The NAS shall monitor performance of navigational systems.

The NAS shall monitor performance of approach systems.

The NAS shall monitor performance of landing aids.

The NAS shall monitor equipment status from workstations that are separate from the equipment that is being monitored.

The NAS shall monitor equipment performance from workstations that are separate from the equipment that is being monitored.

The NAS shall monitor status of equipment without affecting equipment availability.



The NAS shall monitor performance of equipment without affecting equipment availability.

The NAS shall monitor the integrity of non-precision approach space-based navigation guidance information to ensure its availability is not less than 0.99999 (TBD).

The NAS shall generate space-based terminal area navigation guidance information with an availability of navigation and integrity monitoring information of greater than  $1-(1.0 \times 10^{-10})$ .

The NAS shall monitor equipment status from workstations that are separate from the equipment that is being monitored.

The NAS shall store proof that the control and monitoring communications system is functioning properly.

The NAS shall disseminate proof that the control and monitoring communications system is functioning properly.

The NAS shall use unmanned facilities equipped with systems for remote monitoring.

#### 3.9.1.4 Detect operational system failures.

The NAS shall detect navigation systems' performance when it is outside allowable tolerance.

The NAS shall detect navigation aids' performance when it is outside allowable tolerance.

The NAS shall determine the cause of faults of operational equipment at unmanned facilities.

The NAS shall determine the cause of system failures.

The NAS shall exercise operational software to isolate system problems.

The NAS shall exercise operational databases through functional paths to isolate system problems.

The NAS shall determine the fault that caused a system failure.

##### 3.9.1.4.1 System Failure Alert

The NAS shall alert the specialist when a system fails.

The NAS shall alert specialists not more than 10 seconds after any failures of navigation guidance affecting operations within the NAS.

The NAS shall alert specialists not more than 10 seconds after any failures of portions of navigation guidance affecting operations within the NAS.

The NAS shall alert specialists to a full navigation system failure affecting NAS operations within 10 seconds of the failures detection.

The NAS shall alert specialists to a partial navigation system failure affecting NAS operations within 10 seconds of the failures detection.

The NAS shall alert the specialist when a system operating parameters are out of tolerance.

The NAS shall alert specialists to known failures of visual aids at the landing area.

The NAS shall alert specialists when a change in status of a navigation system is detected.

##### 3.9.1.4.2 Alert users to navigation guidance failure

The NAS shall alert users when a navigation guidance system fails.

The NAS shall alert users not more than 10 seconds after any failures of navigation guidance affecting operations within the NAS.

The NAS shall alert users not more than 10 seconds after any failures of portions of navigation guidance affecting operations within the NAS.

The NAS shall alert users to a full navigation system failure affecting NAS operations within 10 seconds of the failures detection.

The NAS shall alert users to a partial navigation system failure affecting NAS operations within 10 seconds of the failures detection.

The NAS shall alert users within 10 seconds, of failures to navigation guidance that affect operations.

The NAS shall alert users to known failures of visual aids at the landing area.

#### 3.9.1.4.3 Manage system failure alarm

The NAS shall manage alarm systems for failures.

The NAS shall display alarms at designated control points until the condition has been corrected.

The NAS shall disseminate the status of alarms to specialists in a timely manner.

The NAS shall store all alarms.

The NAS shall retrieve all alarms.

The NAS shall alert the specialist upon detection of smoke from any system.

#### 3.9.1.5 Maintain NAS operational systems.

The NAS shall provide service availability not less than that provided by existing capabilities. Critical Services - .99999 Essential Services - .999 Routine Services - .99

The NAS shall terminate ground-based navigation guidance, whose performance is outside of the acceptable parameters within 10 seconds of detection.

The NAS shall terminate operation of navigation systems operating outside of allowable tolerances within 10 seconds.

The NAS shall terminate operation of navigation aids operating outside of allowable tolerances within 10 seconds.

The NAS shall discontinue navigational guidance when performance is outside specified parameters within 10 seconds.

The NAS shall determine correction values for navigational aids as required.

The NAS shall disseminate correction values for navigational aids to specialists.

The NAS shall disseminate correction values for navigational aids to users.

##### 3.9.1.5.1 Perform corrective maintenance

The NAS shall perform corrective maintenance on operational systems.

The NAS shall perform corrective maintenance when the performance of an operational system is outside specified parameters.

The NAS shall strive to restore critical system service to users/specialists within 6 seconds of failure

The NAS shall strive to restore essential system service to users/specialists within 10 minutes of failure.

The NAS shall strive to restore routine system service to users/specialists within 1.68 hours of failure.

The NAS shall perform corrective maintenance in response to monitoring system indication.

The NAS shall perform corrective maintenance in response to general user observations.

The NAS shall perform corrective maintenance in response to monitoring system indication in response to FAA technical surveillance.

##### 3.9.1.5.1.1 Perform corrective maintenance on navigational systems

The NAS shall perform corrective maintenance on navigational systems when a failure occurs.

The NAS ground-based navigational aids shall terminate transmittal of a unique identification signal when a system failure occurs.

The NAS ground-based navigational aids shall terminate transmittal of a unique identification signal when system is taken off-line for maintenance.

The NAS ground-based navigational aids shall terminate transmittal of a unique identification signal when system is taken off-line for testing.

The NAS shall recover from temporary loss of ground based navigation guidance information without complete resetting of systems.

The NAS shall restore critical system service within TBD seconds of failure.

The NAS shall restore essential system service with TBD minutes of failure.

The NAS shall restore routine systems service within TBD hours of failure.

The NAS shall control system parameters during the performance of corrective maintenance.

The NAS shall locate maintenance sites to enhance efficient restoration of service and to provide economical preventive maintenance service.

The NAS shall trigger backup equipment for designated systems from designated remote locations in the event of equipment failure.

The NAS shall perform on-site maintenance of unmanned facilities.

The NAS shall repair designated system components of operating equipment at unmanned facilities.

#### 3.9.1.5.1.2 Verify operation of repaired systems

The NAS shall verify operation of repaired operational systems.

The NAS shall verify the operation of repaired equipment at an on-site repair facility.

The NAS shall verify the operation of repaired equipment at an intermediate repair facility.

The NAS shall verify the operation of repaired equipment at a remote depot repair facility.

#### 3.9.1.5.1.3 Establish intermediate level repair facilities

The NAS shall perform repair activities at intermediate level repair facilities.

The NAS depot repair facility shall troubleshoot equipment beyond the capabilities of an intermediate level repair facility.

The NAS depot repair facility shall repair equipment beyond the capabilities of an intermediate level repair facility.

The NAS depot repair facility shall adjust equipment beyond the capabilities of an intermediate level repair facility.

The NAS depot repair facility shall overhaul equipment beyond the capabilities of an intermediate level repair facility.

The NAS depot repair facility shall verify the operation of equipment beyond the capabilities of an intermediate level repair facility.

#### 3.9.1.5.2 Perform preventative maintenance

The NAS shall perform preventative maintenance for operational systems.

The NAS shall perform preventive maintenance in response to FAA technical surveillance.

The NAS shall perform preventive maintenance in response to general user observations.

The NAS shall perform preventive maintenance in response to monitoring system indication.

The NAS shall perform preventive maintenance at scheduled intervals.

The NAS shall determine preventive maintenance intervals for all NAS equipment.

The NAS shall update preventive maintenance intervals for all NAS equipment.

The NAS shall adjust performance of operational systems from remote locations.

The NAS shall verify that operational system adjustments are correct from remote locations.

The NAS shall use diagnostic aids to assist in the performance of preventive maintenance of operational systems.

The NAS shall certify equipment following the completion of maintenance actions.

The NAS shall control system parameters during the performance of preventive maintenance.

#### 3.9.1.6 Identify contingent operation procedures

##### 3.9.1.6.1 Provide system redundancy

The NAS shall provide exchange status condition information for backup purposes.

The NAS shall provide failure notification for ARTCC's to implement the backup capability.

The NAS shall provide ARTCC to notify its backup facilities, associated terminals, and ARTCCC when it is unable to maintain normal operation.

The NAS shall notify all other associated facilities when a capability of any ARTCC has failed.

The NAS shall provide continuous notification of an ARTCC's status to each of its backup facilities.

The NAS shall provide a capability for implementation of the backup operation within two minutes of an ARTCC failure.

The NAS shall provide processing and communications capacities to support the required backup capabilities and to meet the response time requirements specified above, while maintaining safe separation of all aircraft receiving ATC services (i.e., both normal and backup sectors) from the backup facilities.

The NAS shall provide each backup ARTCC with the requisite flight data for assigned backup responsibilities sufficient to allow flight plan association and the creation of flight data displays upon the activation of backup.

The NAS shall provide emergency communications by means independent of common carrier to rapidly disseminate information from FAA headquarters to regional and sectional facilities and, in turn, rapidly communicate the operational status of those facilities back to headquarters.

The NAS shall provide an emergency communications network protected from nuclear, high-altitude electromagnetic pulse (HEMP).

The NAS shall design emergency communications networks to operate for a 30-day period without commercial power at selected critical facilities.

The NAS shall design and locate facilities to optimize system cost and system effectiveness, provide suitable working and environmental conditions for NAS personnel, and provide appropriate operating conditions for NAS equipment.

The NAS shall control equipment remotely.

The NAS shall establish National Field Support Sectors to address system wide problems, develop equipment and software modifications, and provide the highest level of technical assistance on individual facility problems.

##### 3.9.1.6.2 Perform integrated logistics support

The NAS shall perform integrated logistics support.

The NAS shall perform maintenance management.

The NAS shall perform logistics inventory management.

The NAS shall manage supply support in accordance with RMA requirements.

The NAS shall acquire equipment necessary to perform maintenance activities.

The NAS shall acquire systems necessary to perform maintenance activities.

The NAS shall provide the technical work force to accomplish their primary mission of the monitoring, identification, and diagnosis of failures and control of equipment at remote sites.

The NAS shall provide specialists to accomplish highly specialized maintenance tasks at intermediate and depot repair facilities.

The NAS shall provide equipment, systems, installations and facilities in an operable and committable state according to their criticality to safe operations and control of aircraft.

#### 3.9.1.6.3 Manage materials inventory

The NAS shall manage materials inventory.

The NAS shall manage storage of expendable materials.

The NAS shall manage distribution of materials.

The NAS shall acquire replacement parts for NAS equipment.

The NAS shall provide specialists to utilize an automated maintenance management system.

##### 3.9.1.6.3.1 Disseminate maintenance activity reports

The NAS shall disseminate reports on maintenance activities.

The NAS shall summarize reports on equipment performance.

The NAS shall summarize reports on preventive maintenance activities.

The NAS shall summarize reports on equipment repair activities.

The NAS shall disseminate reports on maintenance problem trends.

The NAS shall disseminate reports on equipment performance.

The NAS shall disseminate reports on equipment repair activities.

The NAS shall disseminate results of analysis of maintenance action impacts to specialists.

The NAS shall disseminate degraded performance information of designated systems.

The NAS shall disseminate information on expected failure of designated equipment.

The NAS shall disseminate equipment performance measurements for trend analysis.

The NAS shall disseminate equipment performance measurements for failure anticipation rates.

The NAS shall disseminate maintenance technical data to specialist upon request.

#### 3.9.1.6.4 Analyze maintenance activity information

The NAS shall analyze information gathered from maintenance activities.

The NAS shall acquire data on completed equipment maintenance.

The NAS shall analyze maintenance action impacts on performance.

The NAS shall analyze maintenance action impacts on equipment status.

The NAS shall acquire degraded performance information from designated monitoring systems.

The NAS shall analyze degraded performance information from designated monitoring systems.

The NAS shall analyze trends in maintenance problems.

The NAS shall acquire equipment performance measurements for trend analysis.

The NAS shall acquire equipment performance measurements for failure anticipation rates.

The NAS shall correlate equipment performance measurements for trend analysis.

The NAS shall correlate equipment performance measurements for failure anticipation rates.

#### 3.9.1.6.4.1 Calculate navigation accuracy correction values

The NAS shall calculate navigational accuracy correction values for supplemental navigation systems.

The NAS shall disseminate navigational accuracy correction values for supplemental navigation systems to specialists.

The NAS shall disseminate navigational accuracy correction values for supplemental navigation systems to users.

#### 3.9.1.6.4.2 Store equipment maintenance data

The NAS shall store data on completed equipment maintenance.

The NAS shall store maintenance records.

The NAS shall retrieve maintenance records on request.

The NAS shall store resolution to maintenance problems.

The NAS shall retrieve resolutions to maintenance problems on request.

The NAS shall store reports on equipment performance.

The NAS shall store reports on preventive maintenance activities.

The NAS shall store reports on equipment repair activities.

The NAS shall store equipment performance measurements for trend analysis.

The NAS shall store equipment performance measurements for failure anticipation rates.

The NAS shall store degraded performance information from designated monitoring systems.

The NAS shall store information of expected failure of designated equipment.

The NAS shall provide appropriate data recorders, data reduction equipment, and software for the analysis of test results, as necessary.

#### 3.9.1.7 Operational system status information dissemination

The NAS shall notify specialists of any automatic switchovers of designated equipment.

The NAS shall disseminate bearing information for ground-based navigational aids.

##### 3.9.1.7.1 Disseminate status of navigation aids

The NAS shall disseminate status of navigation aids.

The NAS shall disseminate geographical reference information for ground-based navigational aids.

The NAS shall disseminate identification information for ground-based navigational aids.

The NAS shall disseminate status of supplemental navigation systems to specialists.

The NAS shall disseminate status of supplemental navigation systems to users.

The NAS shall disseminate non-precision approach space-based navigation guidance information.

The NAS shall disseminate the status of supplemental navigation systems to specialists.

The NAS shall disseminate the status of supplemental navigation systems to users.

##### 3.9.1.7.2 Disseminate space-based navigation guidance information

The NAS shall disseminate spaced-based en route navigation guidance information.

The NAS shall disseminate space-based en route navigation guidance information with availability of navigation service and fault detection of at least  $1-(1.0 \times 10)$ .

The NAS shall support integrity monitoring of space-based en route navigation guidance information with an availability of at least  $1-(1.0 \times 10)$ .

The NAS shall disseminate space-based en route navigation guidance information with continuity of fault detection greater than 1 -  $(1.0 \times 10)$  per hour.

The NAS shall support the detection of space-based terminal area navigation guidance information with continuity of fault detection greater than 1 -  $(1.0 \times 10)$  per hour.

The NAS shall disseminate accurate rho measurements subsequent to periods of temporary loss of rho coordination information without completely resetting the affected rho system components.

The NAS shall support navigation and fault the detection of terminal area space-based navigation guidance information to ensure its availability is not less than  $1-(1.0 \times 10)$ .

#### 3.9.1.7.3 Train maintenance specialists

The NAS shall train maintenance specialists.

The NAS shall provide for a training program, including facilities, equipment, methods, and materials, which prepares specialists for the transition to new NAS equipment, computer software, and procedures.

The NAS shall provide for a training program, including facilities, equipment, and materials, which prepares specialists for implementation of the maintenance philosophy embodied in the NAS. The NAS shall provide for the training of:

Facilities, equipment, and materials to support an extensive training program are required to effect the implementation of the maintenance philosophy embodied in the NAS; to facilitate the transition to new NAS equipment, computer software, and procedures; and to provide for the progressive improvement and consistent maintenance of the knowledge and skill levels of all NAS personnel.

The NAS shall provide for a training program, including facilities, equipment, methods, and materials, which results in the continuous and progressive improvement in the skill level of specialists.

The NAS shall provide for the training: a. Identified by the agency as necessary for each position for the achievement of required and optimum efficiency b. As required to improve individual performance or to prepare the individual for specific potential future responsibilities

The NAS shall provide for a distributed training system with instructional programs allocated among a centralized FAA training facility, local training facilities (e.g., ARTCCs and AFSSs), and external facilities, as appropriate.

The NAS shall provide contingency plans for ARTCC's in the event of catastrophic failure.

NAS equipment, systems, installations, and facilities whose functioning is required by the services described in this document shall be designed to ensure that they perform these intended functions under any foreseeable operating conditions.

#### 3.9.1.7.4 Establish test and evaluation programs

The NAS shall establish a test and evaluation program.

The NAS shall meet design specifications through analysis and simulation or test.

The NAS shall provide support for DT&E in the incremental determination of the degree to which functional engineering specifications are attained.

The NAS shall include specified equipment, test sets, test drivers, scenarios, simulators, data reduction equipment and software, and other test support items required for the conduct of testing.

The NAS shall utilize Subject Matter Experts in testing functional integration of units, subsystems, and systems; testing functional integration of hardware with software and operational programs; and testing functional compatibility and integration with operational systems on sites and with the NAS.

The NAS shall utilize Subject Matter Experts in the planning of testing, participate in or observe testing, review test data, and evaluate test results to validate integration of an item and its components/elements.

The NAS shall utilize Subject Matter Experts for operational inputs to planning and conduct of the tests and evaluation of the results of the

tests.

The NAS shall assure the frequency of occurrence goal for any loss of service shall not exceed one per week.

The NAS shall provide support for OT&E to validate that operational requirements are met. This shall include determination of a system's operational effectiveness and suitability to be part of the NAS and identification of needed modifications.

The NAS shall perform OT&E to demonstrate functional integration of hardware components, software elements, hardware and software, and the end item with other equipment.

The NAS shall provide support for validation of new or modified equipment or computer software at operational sites to verify integration with the site and with the NAS and to verify its suitability for use in an operational environment.

The NAS shall provide a test bed consisting of all appropriate NAS equipment, including remote monitoring and control equipment, which can be configured to provide the physical and functional interfaces found at NAS operational sites.

The NAS shall provide simulators, target and message generators, and external interfaces necessary to exercise the item.

The NAS shall provide instrumented aircraft to test the item in the system under known conditions

The NAS shall provide data recorders and data reduction equipment and programs necessary for evaluation of the performance of test items

The NAS shall provide test equipment and spare parts for maintenance of items under test.

The NAS shall provide laboratory facilities to conduct environmental and electromagnetic interference EMI tests

Specialists shall operate and maintain test items during OT&E at sites.

The NAS shall provide support for PAT&E to determine whether serial production items consistently are of the same quality and have the same technical and operational characteristics as items that have been previously tested and accepted and to incorporate specified improvements.

The NAS shall provide equipment, as necessary, for PAT&E conducted at the developer's/manufacturer's factory to verify contractual compliance of the test item.

The NAS shall participate in factory compliance testing, observe testing, participate in testing where required, review test data, and evaluate test results to ensure contractual compliance and to ensure that specified improvements have been incorporated into the item.

The NAS shall provide data recorders, data reduction equipment, and software for the analysis of test results, as necessary.

The NAS shall provide unique installation tools and equipment and unique test equipment required only for initial site certification.

If necessary, the NAS shall provide instrumented aircraft for the conduct of this testing.

The NAS shall be capable of providing the specialists necessary to plan testing, to operate and maintain the item under known conditions, and to evaluate test results.

#### 3.9.1.7.4.1 Flight Inspect navigational aids

The NAS shall perform flight inspections to verify performance of ground systems that are critical to safety.

The NAS shall perform flight inspections to verify performance of air systems that are critical to safety.

The NAS shall perform flight inspections to verify operation of air systems that are critical to safety.

The NAS shall perform flight inspections to verify operation of ground systems that are critical to safety.

#### 3.9.2 Spectrum Management

##### 3.9.2.1 Secure spectrum for the FAA

The NAS shall secure and protect national radio spectrum for the FAA and the US Aviation community.

The NAS shall coordinate national spectrum allocation programs.



The NAS shall establish new systems spectrum development activities compatible with projected national use.

#### 3.9.2.1.1 Secure frequency for the FAA

The NAS shall establish new systems frequency development activities compatible with projected national use.

The NAS shall establish new systems frequency development activities compatible with current national use.

The NAS shall establish national frequency allocation programs.

#### 3.9.2.1.2 Secure international spectrum

The NAS shall comply with national standards to avoid the interference of new systems with existing systems.

The NAS shall establish new systems spectrum development activities compatible with current national use.

The NAS shall coordinate national spectrum management assistance programs.

The NAS shall disseminate en route navigational guidance such that ambiguities in guidance information have a minimal impact on NAS operations.

#### 3.9.2.1.3 Manage international spectrum

The NAS shall comply with international standards to avoid the interference of new systems with existing systems.

The NAS shall establish international management assistance programs.

The NAS shall establish new systems spectrum development activities compatible with current international use.

The NAS shall establish new systems spectrum development activities compatible with projected international use.

##### 3.9.2.1.3.1 Manage international frequency

The NAS shall coordinate international frequency allocation programs.

The NAS shall establish new systems frequency development activities compatible with projected international use.

The NAS shall establish new systems frequency development activities compatible with current international use.

The NAS shall coordinate international spectrum allocation programs.

#### 3.9.3 Government-Agency Support

##### 3.9.3.1 Support coordination with government and civil agencies

The NAS shall provide appropriate voice and data communications connectivity between designated military facilities and designated backup ARTCCs. (Refer to Para. 3.6.2.B.)

The NAS shall discontinue dissemination of navigation guidance information in accordance with the military command/FAA supplemental agreements to support national defense requirements.

The NAS shall restrict dissemination of navigation guidance information in accordance with the military command/FAA supplemental agreements to support national defense requirements.

The NAS accept data from external agencies cooperating in search and rescue with minimal manual processing.

The NAS shall store data from external agencies cooperating in search and rescue with minimal manual processing.

The NAS shall accept requests for routine or special military air operations.

##### 3.9.3.2 Support information exchange with government and civil agencies

The NAS shall facilitate operation of military air traffic control facilities.

The NAS shall exchange data between FAA and DoD air traffic control facilities in a timely manner.

The NAS shall coordinate the transition of aircraft to or from airfields serviced by military air traffic control facilities.

The NAS shall coordinate the transition of aircraft serviced by military air traffic control facilities to airfields serviced by FAA en route controllers

The NAS shall coordinate with DoD air traffic control facilities for the provision of common services to military aviation users.

The NAS shall coordinate with DoD air traffic control facilities for the provision of common services to civil aviation users.

The NAS shall reject requests for routine or special military air operations.

The NAS shall evaluate the impact of requests for routine or special military air operations.

The NAS shall approve requests for routine or special military air operations.

The NAS shall disseminate information regarding military aircraft activity to non-participating civil users.

The NAS shall disseminate information regarding military aircraft activity to non-participating military users.

The NAS shall respond to national defense initiatives in accordance with Executive Orders.

#### 3.9.3.2.1 Support special use airspace

The NAS shall acquire airspace reservations from military users.

The NAS shall accept airspace reservations from military users.

The NAS shall reject airspace reservations from military users.

The NAS shall approve airspace reservations from military users.

The NAS shall disapprove airspace reservations from military users.

The NAS shall store airspace reservations from military users.

The NAS shall disseminate airspace reservations from military users.

The NAS shall acquire special use airspace reservations.

The NAS shall accept special use airspace reservations.

The NAS shall reject special use airspace reservations.

The NAS shall approve special use airspace reservations within 30 minutes of initial receipt of request.

The NAS shall disapprove special use airspace reservations within 30 minutes of initial receipt of request.

The NAS shall acquire military air traffic control plans related to national emergencies.

The NAS shall store military air traffic control plans related to national emergencies.

The NAS shall disseminate military air traffic control plans related to national emergencies.

The NAS shall implement military air traffic control plans related to national emergencies.

The NAS shall disseminate activity information on low-level routes by military users.

The NAS shall validate classified route proposals with security classifications up to and including secret.

The NAS shall reject classified route proposals with security clearances up to and including SECRET from military scheduling activities.

The NAS shall reject classified flight plans with security clearances up to and including SECRET from military scheduling activities.

The NAS shall reject unclassified flight plans from military scheduling activities.

#### 3.9.3.2.2 Support air defense operations.

The NAS shall disseminate position of aircraft operating within an ADIZ to military officials.

The NAS shall disseminate velocity of aircraft operating within an ADIZ to military officials.

The NAS shall disseminate velocity of aircraft operating within an ADIZ to law enforcement officials.

The NAS shall disseminate altitude of aircraft operating within an ADIZ to military officials.

The NAS shall disseminate altitude of aircraft operating within an ADIZ to law enforcement officials.

The NAS shall disseminate identification of aircraft entering an ADIZ to military officials.

The NAS shall disseminate identification of aircraft entering an ADIZ to law enforcement officials.

The NAS shall correlate flight plans of known inbound aircraft with aircraft penetrating an ADIZ within 8 seconds of initial penetration.

The NAS shall correlate flight plans of known inbound aircraft with aircraft penetrating a DEWIZ within 8 seconds of initial penetration.

The NAS shall alert specialists when an inbound aircraft track entering an ADIZ fails to correlate to a known flight plan within a means response time of 0.6 of the failure.

The NAS shall alert specialists when an inbound aircraft track entering an ADIZ fails to correlate to a known flight plan within a 99th percentile response time of 1.2 of the failure.

The NAS shall alert specialists when an inbound aircraft track entering an ADIZ fails to correlate to a known flight plan within a maximum response time of 3.0 of the failure.

The NAS shall detect aircraft within an ADIZ on a continuous basis.

The NAS shall identify aircraft within an ADIZ on a continuous basis.

The NAS shall exchange flight plan data with military air defense personnel.

#### 3.9.3.2.3 Support law enforcement agencies.

The NAS shall disseminate position of aircraft operating within an ADIZ to law enforcement officials.

The NAS shall exchange flight plan data with law enforcement authorities.

The NAS shall accept requests from law enforcement authorities to track aircraft of special interest.

The NAS shall identify aircraft of special interest for law enforcement authorities.

The NAS shall disseminate identity of aircraft of special interest to law enforcement agencies.

The NAS shall disseminate position information of aircraft of special interest to law enforcement agencies.

The NAS shall detect aircraft operating in NAS airspace using the registration number of an aircraft of special interest.

The NAS shall alert specialists to aircraft operating in NAS airspace using registration number from stolen aircraft within 1 minute of initial detection.

The NAS shall acquire registration numbers of stolen aircraft.

The NAS shall store registration numbers of stolen aircraft.

The NAS shall provide a capability for automatic track initiation and flight plan association in the backup airspace within 60 seconds of an ARTCC failure.

The NAS shall provide assistance in studies for the selection of preferred alternative system concepts, identification of preferred technical approaches, development of specifications, and establishment of boundaries for technical and operational parameters.

### 3.10 Enabling Services

### 3.10.1 Automation

The NAS shall provide automation services to enable information to be requested, stored, archived and retrieved

#### 3.10.1.1 Display critical information

The NAS shall display critical information to the specialist.

The NAS shall display discriminating presentation of designated functional category levels of weather intensity, controller alerts, flight plan amendments, emergencies, altitude assignments, and track control.

The NAS shall automate communications capabilities to reduce specialist and user workload.

The NAS shall retain and display sender/addressee identification.

The NAS shall provide the supervisor a duplicate specialist display to monitor data flow, data inputs and any messages displayed to the specialist

The NAS shall record data processed by or displayed to the specialist.

The NAS shall provide capabilities to perform the required backup support functions while meeting response time requirements.

The NAS shall display airspace structure information.

The NAS shall display aircraft positionrelated information in relation to airspace structure information.

The NAS shall display airspace structure information to within .26 nmi (99th percentile) of its actual position.

#### 3.10.1.2 Alert Users of Collision Through Visual Means

The NAS shall alert users of a predicted possible collision through visual means.

The NAS shall display a unique alert symbol for aircraft that are in potential violations of separation standards.

The NAS shall alert specialists of an imminent collision by visual signals that are distinct from any other signals presented to the specialist.

The NAS shall alert specialists of an imminent collision by aural signals that are distinct from any other signals presented to the specialist.

The NAS shall alert responsible specialists of a prediction of a possible collision through audible means.

The NAS shall alert responsible specialists of predictions of possible aircraft collisions through visual means.

The NAS shall display a unique alert symbol for actual aircraft violations of separation standards.

The NAS shall alert appropriately equipped users to the collision danger within 10 seconds after the prediction is made.

The NAS shall alert affected users of a predicted possible collision through audible means.

The NAS shall generate an aural alarm for predicted aircraft-obstacle separation standards violations.

The NAS shall generate a visual alarm for predicted aircraft-ground separation standards violations.

The NAS shall generate a visual alarm for predicted aircraft-terrain separation standards violations.

The NAS shall generate a visual alarm for predicted aircraft-obstacle separation standards violations

The NAS shall generate an aural alarm for predicted aircraft-ground separation standards violations.

The NAS shall generate an aural alarm for predicted aircraft-terrain separation standards violations.

The NAS shall distinguish between designated functional category levels of controller alerts on displays.

#### 3.10.1.3 Issue Automated visual alerts for surface conflicts at designated aerodromes

The NAS shall issue automated visual alerts when potential surface conflicts are predicted on the movement area environment at designated aerodromes.

The NAS shall issue automated aural alerts when potential surface conflicts are predicted on the movement area environment at designated aerodromes.

The NAS shall issue automated visual alerts when actual surface conflicts are detected on the movement area environment at designated aerodromes.

The NAS shall issue automated aural alerts when actual surface conflicts are detected on the movement area environment at designated aerodromes.

### 3.10.2 Communications

#### 3.10.2.1 Voice and Data communication with users, specialists, ATC facilities, and other Government Agencies

The NAS shall transfer information between aircraft and NAS ground facilities.

The NAS shall provide specialists commercial telephone service for non-routine flight services to users.

The NAS shall not derogate quality of voice or data communications provided by the NAS interfacility by interfacing to public or private networks.

The NAS shall provide surveillance information exchange communications interface capabilities with appropriate federal and local law enforcement agencies.

The NAS shall provide a data communications interface to accommodate the exchange of surveillance information with properly equipped sources external to the NAS to complement the NAS surveillance coverage. Such sources shall include, but not be limited to, joint use surveillance facilities; military radars and surveillance processing facilities, such as Fleet Air Control and Surveillance Facilities (FACSFAC) and Programmable Indicator Data Processor (PIDP) sites; and airline tracking networks, such as the Aeronautical Radio, Inc. (ARINC) network.

The NAS shall provide voice and data communications interface to accommodate air carrier automatic flight plan filing and cancellation capabilities with airline dispatch offices.

The NAS shall provide interfaces with public, private, and other government-owned data communications networks to designated NAS facilities; airline dispatch offices; foreign military and ATC facilities; and DoD facilities.

The NAS shall interface with defined DoD communications networks.

The NAS shall interface operational positions with public or private telephone networks.

The NAS shall interface operational positions with public/private communications facilities.

The NAS shall interface operational positions with commercial communications networks to assure blocked calls do not exceed 1 in 20 calls.

The NAS shall assure indirect-access blocked calls do not exceed 1 in 1000 calls.

The NAS shall provide one touch speed dial access to indirect calls.

The NAS shall interface operational positions with indirect-access voice communications with other operational positions in selected facilities.

The NAS shall provide capabilities for additional direct-access voice communications connectivity for use within 2 minutes of a catastrophic failure in an ARTCC.

The NAS shall provide inter-facility direct-access voice communications.

The NAS shall provide a communications capability between selected operating, supervisory, maintenance, and administrative positions at separate NAS facilities.

The NAS shall exchange aviation-related information between governmental and non-governmental agencies.

The NAS shall provide continuous inter-facility and intra-facility ground-ground communications.

The NAS shall provide data connectivity between the local traffic management coordinators and the ARTCC specialists.

The NAS shall establish data communications with users requiring altitude reservation services and ATCSCC specialists.

The NAS shall establish voice communication between users requiring altitude reservation services and ATCSCC specialists.

The NAS shall communicate with all military aircraft using low-level training routes between exit altitude of the route and 10,000 feet AGL.

The NAS shall exchange data with DoD using voice communications.

The NAS shall exchange data with DoD using data communications.

The NAS shall exchange data with DoD using automated systems.

The NAS shall exchange data with law enforcement authorities using voice communications.

The NAS shall exchange data with law enforcement authorities using data communications.

The NAS shall exchange data with law enforcement authorities using automated systems.

The NAS shall alert military officials using secure communications.

The NAS shall alert law enforcement officials using secure communications.

The NAS shall maintain communications links to assist maintenance activities.

#### 3.10.2.2 Reliable communications

The NAS shall provide reliable communications.

The NAS shall provide air-ground data communications with error detection and correction, and signal regeneration capabilities.

The NAS shall provide computer assisted message handling (e.g., formatting, blocking, and reconstruction).

The NAS shall provide interfacility and intrafacility data communications with error detection and correction capabilities.

The NAS shall provide expandable, cost effective inter-facility voice and data communications connectivity.

The NAS shall provide protection against interference from undesired signals on the same or adjacent frequencies.

The NAS shall provide the capability to sustain data exchange with all suitably equipped users.

The NAS shall detect message format errors.

The NAS shall provide single key acknowledgment by addressee of message receipt and content.

The NAS shall provide single data transmission for multiple clients/customers

The NAS shall provide discrete addressing for transmitting data messages. Messages shall be deliverable when 32 users are contained in a 10 nmi by 10 nmi area and when 497 users are contained within a 50 nmi by 50 nmi area.

The NAS shall assure one-way air-to-ground voice transmissions do not produce delays that adversely impact aeronautical operations or services.

The NAS shall assure ground-air transmission time for data messages not exceed 6 seconds.

The NAS shall provide data communications between ground locations and aircraft at and above 6000 feet MSL or at and above minimum en route altitude, whichever is higher, up to 60,000 feet MSL

The NAS shall provide data communications to ground level at qualifying terminal facilities (those meeting Air Traffic Service criteria for air-ground data communications)

#### 3.10.2.3 Store Communications

The NAS shall store communications.

The NAS shall record all voice communications entering or leaving each specialist's position at ARTCCs, ATCTs, AFSSs, the ATCSCC, and the FAA Headquarters Operations Center.

The NAS shall be able to receive, store, retain, and readily retrieve NAS interfacility and intrafacility ground-ground communications.

The NAS shall interface recorded coded time source at selected facilities voice and data recordings to provide time-related data.

Individual air-ground data messages shall be retrievable from "off-line" storage within 5 minutes of a request by authorized NAS personnel.

The NAS shall provide retrievable air-ground data messages within 30 minutes and from "off-line" storage within 60 minutes.

The NAS shall retain recordings of air-ground data messages for not less than 30 days.

The NAS shall retain recordings of air-ground voice transmissions for not less than 15 days.

The NAS shall record air-ground voice and data communications.

The NAS shall receive, store, retain, and readily retrieve all air-ground communications.

The NAS shall retrieve individual data messages from "off-line" storage.

The NAS shall retrieve individual voice recordings from "off-line" storage within 30 minutes of a request.

The NAS shall store data recordings in "off-line" storage for not less than 15 days.

The NAS shall store voice recordings in "off-line" storage for not less than 15 days.

The NAS shall record all accountable data messages utilized at each specialist's position at each of these facilities. The data recorded shall ensure that all information utilized by the specialist and/or displayed at the specialist's position and all actions or messages initiated by the specialist can be reconstructed.

In-flight operations are enhanced by the availability of monitoring services. The NAS is required to provide monitoring services to assist the user in emergency situations, in avoiding other aircraft and in adverse weather.

The NAS shall monitor initiation, continuation, and break off to the specialist and not distract normal operations.

The NAS shall provide specialists to selectively monitor the content of all air-ground voice and data communications and video displays at each operating position.

The NAS shall provide monitoring support to any operating position without introducing any change in transmission or reception characteristics.

#### 3.10.2.4 Configure Communications

The NAS shall provide configurable communications.

The NAS shall configure communications for to provide the ARTCC's redundant connectivity for surveillance, data, and ground-to-ground and air to air voice connectivity.

The NAS shall provide auto-answer capabilities for dial-up data communications by users through interface to commercial telephone lines for filing flight plans and amendments, requesting and receiving terminal and area-specific weather data, and other related purposes. The number of incoming calls blocked because of saturation of FAA-owned equipment shall not exceed 1 in 20 calls.

The NAS shall provide configuration of ground-to-ground voice communications to achieve communications between control positions within the backup facility and control positions in other facilities.

The NAS shall provide reconfiguration of air-to-ground voice communications to achieve communications with aircraft in backup airspace assigned to positions within the backup facility.

The NAS shall provide rapid reassignment of operational and backup sectors to any operating or training position in the facility.

The NAS shall provide reconfiguration of communications capabilities without degradation of air-ground voice or data communications.

The NAS shall provide specialists in adjacent ARTCCs control of the air-ground voice communications and primary responsibility for the air-ground data communications capabilities associated with designated sectors and/or sector regions within 2 minutes of an ARTCC failure.

The NAS shall provide preset reconfiguration modes to be activated automatically or for a supervisor to initiate command for individual positions and for the entire ATC facility.

The NAS shall provide selective reconfiguration of air-ground voice and data communications channels to different specialist positions within



the same ATC facility.

The NAS shall configure communications to support changes in operating position responsibilities.

The NAS shall provide air-ground communications continuously. Each VSCS supported facility shall be provided the capability to access A/G radio control equipment independent of VSCS.

The NAS shall provide one channel modular expansion and/or one position at a time for ARTCC, ATCT, and AFSS air-ground voice and data communications

The NAS shall provide computer assisted and/or supervisory control of the reconfiguration capabilities for intrafacility and interfacility data communications at designated specialist positions within an ARTCC or an ATCT.

The NAS shall provide reconfiguration for distribution of intrafacility and interfacility communications to permit an ARTCC to provide service in airspace normally served by a failed ARTCC.

The NAS shall provide reconfiguration for the distribution of intrafacility and interfacility communications within ATC facilities to accommodate changes in individual position responsibilities, daily combining and de-combining of sectors, specialist training, and maintenance actions.

The NAS shall reconfigure communication capabilities to support changes in operating responsibilities.

The NAS shall provide intrafacility voice and data communications modular expansion.

The NAS shall support peak busy hour exchange of data including short-term peaks that may occur within the peak hour, with minimal change in the data transmission response times and no loss of data.

The NAS shall provide an intrafacility data communications at each ATC facility and the ATCSCC.

The NAS shall selectively assign or restrict access to any or all of the special voice communications features (including access to public or private telephone networks) at each specialist's position.

The following capabilities shall be provided at each position within an ATC facility (ARTCC, ATCT, AFSS), and the ATCSCC for interfacility and intrafacility voice transmissions:

The NAS shall provide supervisory personnel in an ATC facility to monitor the direct-access and indirect-access interfacility and intrafacility voice transmissions of each specialist within that facility.

The NAS shall provide queuing of indirect-access and direct-access interfacility and intrafacility voice transmissions entering the position.

The NAS shall provide the specialist to force urgent direct-access or indirect-access interfacility and intrafacility calls through to a busy receiver by overriding the existing call.

The NAS shall provide specialists with indirect-access voice communications to all other positions within the same facility.

The NAS shall provide direct-access voice communications capabilities between specified positions within ARTCCs, ATCTs, AFSSs, the ATCSCC, and the FAA Headquarters Operations Center.

The NAS shall provide communication between selected operating, supervisory, maintenance, and administrative positions within or between NAS facilities.

The NAS shall provide communication between and within the various NAS facilities.

The NAS shall provide air-ground communications within the operational jurisdictions of NAS.

The NAS shall provide intelligible air-ground voice communications.

The NAS shall provide VHF/UHF voice channels at selected AFSSs for en route flight advisory service communications.

The NAS shall provide VHF/UHF channels for transmission of pre-recorded and/or computer-generated voice messages at all ARTCCs, ATCTs, and AFSSs.

The NAS shall provide at least 5 discrete UHF voice channels for single-frequency approach communications from ground level to a minimum altitude of 3000 feet AGL for a minimum radial distance of 5 statute miles, subject to terrain constraints, around control towers serving military users.

The NAS shall provide VHF/UHF voice channels for communications from ground level to a minimum altitude of 3000 feet AGL for a



minimum radial distance of 5 statute miles, subject to terrain constraints, around control towers serving users at terminal facilities.

The NAS shall provide VHF/UHF voice channels for en route communications between specialists located in area control facilities (ARTCCs) and automated flight service stations (AFSSs) and users at altitudes at and above 2000 feet AGL (except in areas of low activity) and for lower altitude coverage in areas of special concern (such as military training routes and areas of high rotorcraft activity).

The NAS shall provide VHF voice channels in the 136.000 to 137.000 MHz band in accordance with forthcoming international agreements.

The NAS shall provide data channels in the frequency band appropriate for air-ground data communications equipment for data communications coverage for both civil and military users.

The NAS shall provide VHF voice channels in the 117.975 to 136.000 MHz band and UHF voice channels in the 225 to 400 MHz band for air-ground voice communications coverage. VHF and UHF voice channels shall be provided for communications with civil and military users, respectively.

The NAS shall provide air-ground voice and data communications within the en route and terminal airspace of the conterminous United States, Alaska, Hawaii, and Puerto Rico.

The NAS shall provide VHF voice channels for ground control or clearance delivery communications between specialists at terminal facilities and users and vehicles on the aerodrome surface or controlled movement areas. The NAS shall provide UHF voice channels at terminal facilities serving both civil and military users for ground control communications.

The NAS shall provide transfer surveillance, flight plan, flight movement, weather, and monitoring and control information between aircraft and the ground, between ground facilities (interfacility ground-ground), and within NAS facilities (intrafacility ground-ground) is necessary for safe and efficient operation of the NAS.

#### 3.10.2.5 Emergency Communications

The NAS shall provide emergency communications.

The NAS shall provide appropriate emergency agencies off-line data generation, and data storage.

The NAS shall provide appropriate emergency agencies simultaneous voice and data communications.

The NAS shall support communications with essential emergency services.

The NAS shall provide appropriate government agencies information on the operational status of the NAS for executive crisis management and control of the national emergency and reconstitution of the NAS.

The NAS shall provide receipt and transmission of emergency voice communications via VHF and UHF at AFSSs while maintaining voice communications via normal assigned VHF and/or UHF channels.

#### 3.10.2.6 Aircraft-Controller Communication

The NAS shall establish communications between controllers and aircraft via voice communications.

The NAS shall establish communications between controllers and aircraft via data communications.

The NAS shall communicate with all military aircraft using low-level training routes between entry altitude of the route and 10,000 feet AGL.

The NAS shall provide data communications from specialists in ARTCCs, ATCTs, and AFSSs to users in appropriately equipped aircraft.

The NAS shall disseminate clearances to aircraft via data link communications.

The NAS shall issue clearances to aircraft via voice communications.

The NAS shall establish communications between controllers and aircraft, via visual signals when voice or data communications fail or are unavailable.

#### 3.10.2.7 NAS Inter-Facility Data Communications

The NAS shall provide data communications capabilities between NAS facilities.

The NAS shall provide intelligible interfacility voice communications.

The NAS shall provide secure voice and data communications between selected NAS facilities and DoD facilities.

#### 3.10.2.7.1 Data Exchange with Airline Dispatch Offices

The NAS shall exchange airport utilization data with Airline Dispatch Offices.

The NAS shall exchange airport utilization data in voice communication format.

The NAS shall exchange airport utilization data in data communication format.

The NAS shall exchange scheduled airline data with Airline Dispatch Offices.

The NAS shall exchange scheduled airline data in data communication format.

The NAS shall exchange scheduled airline data in voice communication format.

#### 3.10.2.8 Controllers and surface vehicles

The NAS shall establish communications between controllers and surface vehicles via voice communications.

The NAS shall establish communications between controllers and surface vehicles via data communications.

The NAS shall establish communications between controllers and surface vehicles, via visual signals when voice or data communications fail or are unavailable.

### 3.10.3 Security

#### 3.10.3.1 Prevent disclosure of classified information

All NAS systems shall provide recovery measures from security incidents

The NAS shall prevent disclosure of classified information to unauthorized persons.

The NAS shall prevent disclosure of sensitive information to unauthorized persons.

#### 3.10.3.2 Control physical access to equipment facilities

The NAS shall control physical access to equipment and facilities.

The NAS shall provide physical security to prevent damage to information, equipment, and facilities.

The NAS shall provide physical security to prevent unauthorized access to information, equipment, and facilities.

The NAS shall provide physical security to prevent damage to information, equipment and facilities.

#### 3.10.3.3 Protection of NAS systems

The NAS shall provide security measures at facilities for protection of NAS systems.

The NAS shall immediately notify the appropriate personnel when an attempt to violate physical security is detected.

The NAS shall verify user authorization and limit access to computer operational programs and databases.

#### 3.10.3.4 Criteria for access of clearances

The NAS shall establish criteria for determining who shall have access or clearances to information on a need -to-know basis.

The NAS shall deny effective use of information even if access is gained.

The NAS shall prevent unauthorized persons from gaining access to information systems

The NAS shall enforce established security rules and procedures.

The NAS shall control access to facilities and information.

#### 3.10.3.5 Protect NAS assets

The NAS shall protect NAS assets.

The NAS shall protect assets from unacceptable degradation of service.

The NAS shall protect assets from denial of service

The NAS shall protect assets against false or misleading data

The NAS shall protect assets from unauthorized creation

The NAS shall protect assets from unauthorized deletion

The NAS shall protect assets from unauthorized modification

#### 3.10.3.6 Security rules on an entity's access attempts

The NAS shall enforce system security rules on an entity's access attempts.

The NAS shall restrict the release of NAS data to authorized entities.

The NAS shall authenticate an authorized entity's identity.

The NAS shall uniquely identify all authorized entities.

The NAS shall deter repeated unsuccessful attempts to gain access, in accordance with system security rules.

The NAS shall detect repeated unsuccessful attempts to gain access.

#### 3.10.3.7 Implement non-repudiation

The NAS shall implement non-repudiation.

The NAS shall alert specialists when malicious activity is detected.

The NAS shall deter malicious activity.

The NAS shall detect malicious activity.

#### 3.10.3.8 Provide the required level of security and necessary training

All NAS systems shall provide the required level of security and necessary training based upon and and .

The NAS shall implement technical security management.

The NAS shall protect access to assets during all operational states.

The NAS shall enforce system security rules during all operational states.

#### 3.10.3.9 Maintain security logs

The NAS shall record the security audit log during all operational states.

The NAS shall record all system access attempts in a security audit log.

The NAS shall preserve the security audit log for a minimum of 90 days.

The NAS shall prevent modification of the events recorded in the security audit log.

The NAS shall record all detected malicious activity in the security audit log.

The NAS shall record all attempts to violate system security rules in the security audit log.

The NAS shall record all security administration activities in the security audit log.

#### 3.10.3.10 Control access to manned facilities

The NAS shall continually control access to manned facilities to prevent interruption of service.

The NAS shall continually control access to manned facilities to prevent distractions of specialists.

The NAS shall continually control access to manned facilities to prevent unauthorized access to computers

The NAS shall continually control access to manned facilities to prevent the theft of government property.

The NAS shall prevent unauthorized modifications to flight plans.

#### 3.10.3.11 Rules and procedures for security to control access to facilities and information

The NAS shall establish rules and procedures for security to control access to facilities and information.

The NAS shall store classified information.

The NAS shall store security sensitive information.

The NAS shall secure unclassified voice and data communication.

The NAS shall provide physical security to protect of classified up to and including Secret.

The capability shall encrypt/decrypt classified information up to and including Secret for data transmission between selected NAS facilities and DoD facilities.

#### 3.10.3.12 Implement security audit review mechanisms

The NAS shall implement security audit review mechanisms.

#### 3.10.3.13 Segregate interface equipment

The NAS shall segregate interface equipment performing air traffic control functions.

The NAS shall segregate interface equipment for encrypting data communications to computer equipment performing air traffic control functions.

The NAS shall segregate interface equipment for storing classified information to computer equipment performing air traffic control functions.

### 3.11 Performance Requirements

Performance requirements are currently being developed by ITT. When these requirements become mature and have been reviewed by the FAA, they will be added to this document.

### 3.12 Reliability, Maintainability, and Availability

Requirements for reliability, maintainability, and availability are currently being developed. They will be added to this document at a later date.